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Reference

JUNGLE OPERATIONS

HEADQUARTERS, DEPARTMENT OF THE ARMY

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HEADQUARTERS,
DEPARTMENT OF THE ARMY
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JUNGLE OPERATIONS

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CHAPTER 1
GENERAL CONSIDERATIONS

Section I. INTRODUCTION

1. Purpose and Scope

a. This manual furnishes guidance to individuals and units on military operations in a jungle. It describes the difficulties encountered in a jungle and explains how these difficulties can best be overcome. This includes acquainting the individual with the jungle; instructions on navigation in the jungle; solutions to the problems of supply; and methods for individual and group survival.

b. Users of this manual are encouraged to submit recommended changes or comments to improve the manual. Comments should be keyed to the specific page, paragraph, and line of the text in which change is recommended. Reasons should be provided for each comment to insure understanding and complete evaluation. Comments should be forwarded direct to U. S. Army Caribbean.

2. Orgonization

Military operations in jungle terrain may require some reorganization and changes in equipment of the Infantry and Airborne infantry divisions. Changes in organization and equipment are

dependent upon the characteristics of the proposed area of operations. In general, the more undeveloped the area, the more changes will be required. Changes to be considered are the elimination of wheeled vehicles and weapons not suitable for the terrain, and the addition of boats, pack transportation, aircraft, and tracked vehicles.

3. Command

While unity of command must be continually maintained, the difficulties of terrain, visibility, and weather so complicate control that its decentralization is an acknowledged characteristic of jungle operations. Jungle combat is primarily one of many separate engagements conducted by small decentralized units. Leaders of small units must be thoroughly trained in leadership and self-reliance and every individual thoroughly briefed on the mission of his unit.

4. Tactics

a. The present tactical doctrine and principles are applicable to jungle operations.

b. Military operations in jungle terrain include many of the types of combat that are considered as special operations. They include combat in dense woods, mountains, night combat, and river crossings. The difficulties of terrain, vegetation, weather, and visibility complicate the problems of command, movement, and supply to the point where normal methods must be modified and special equipment employed.

c. The jungle offers so much concealment and limits visibility to such an extent that surprise in the attack and defense may be exploited to an unusual degree. Formations are more compact and similar to those employed in normal night operations. To maintain control and direction, small columns are used almost up to the point of actual combat. Movement is restricted, tending to stabilize and limit objectives.

d. The nature of the terrain will normally prevent the employment of large forces, so jungle combat reduces itself to a series of small unit actions. Opportunities to deceive and surprise the enemy will be constantly present in the jungle.

e. The employment of the heavy Infantry weapons and Artillery will be greatly hampered by their bulk and weight, by the lack of trafficable roads, soft soil, dense growth of trees, thick undergrowth, and by the limitations on observation and visibility due to the nature of the terrain and vegetation.

5. Logistics

Logistics in jungle operations are characterized by rapid deterioration of all classes of supplies; difficulty in movement; the importance of keeping supply and distribution points close behind advancing troops; the increased emphasis on preventive medicine and the essential need for the practice of supply economy by every individual. Proper security of logistical installations must be a continuing operation since jungle warfare is

conducive to infiltration, guerrilla action, and raids.

Section II. JUNGLE ENVIRONMENT

6. Introduction

a. The term jungle calls to mind a picture of impenetrable forest with insects, snakes, and wild animal life. Even though poorly illuminated and foreboding in appearance, the jungle is far from being insurmountable to a well trained and disciplined military force. Our approach to the jungle must be positive. The advantages of conditions found must be exploited to the utmost. To do this we must know the jungle; its characteristics, causes, plant and animal life; and its effect on military operations.

b. The jungle generally is covered with thick palms along flooded banks and swamps and dense growth of trees from the upper level of the swamps to the top of hills. Between the large trees are smaller trees, ferns, thorn vines, and a great variety of shrubs and bushes interlaced with vines. The soil will be soft, making footing difficult to obtain.

c. The most important problems presented by the jungle are the adverse effects that climatic conditions, landforms, and vegetation have on any operation. To counteract these effects, we must know the jungle and learn to use it against our enemies.

7. Terrain

a. Most jungle terrain is very rugged, with swamps and deep valleys and steep ridges alternating. Rivers and streams are plentiful due to the heavy rainfall. The heavy water runoff rapidly breaks down mountains into hills and ridges. The soil is usually so soft that good footing on steep slopes is difficult. After several men pass over a trail, it gets very muddy and slippery so that the column must reduce its speed to preclude the column from splitting. Conditions conducive to landslides and soil creep are found in many areas where the slopes are steep and wet.

b. The hills will be steep with ridges broken by valleys and crevices making movement with a compartment either by ridges or stream beds difficult. On the other hand, in the mountains, one is able and at times forced to travel with compartments, due to the great changes in cross compartment elevation.

c. The best avenues of travel are along ridges and across saddles. Native trails are almost invariably along ridges, often making long detours to avoid low ground and deep valleys.

d. Swamps will be encountered along rivers and streams that overflow their banks and other low areas.

8. Vegetation

a. The most dominating characteristic of the jungle is vegetation. The classification generally given to the various types are: rain forest, decid-

ious forest, and Savanna. These are further broken down into various subtypes, none of which is of significant value to the individual. Vegetation should be associated with specific areas. Therefore, vegetation will be described by associating them with specific types of terrain.

b. Along the sandy beaches usually just above tidal level, coastal thickets will be encountered. The vegetation here varies, growing thick and attaining heights of 30 feet or more. Palms can be found scattered throughout the thickets. Movement through these areas will be slow and difficult.

c. In the areas between low and high tide, mangrove swamps will be found. At times, they can be found where there is no tide at all. The vegetation varies in height ranging from a few feet to

Figure 1. Coastal thickets.

Figure 2. Mangrove swamps.

70 or more feet. The trees are characterized by massive aerial roots, some like stilts, dropping from the branches into the water. The trees grow close together and although undergrowth is restricted by the water, the obstacle caused by these trees and their roots is one of the most serious encountered in the jungle.

d. Along the rivers and streams that overflow their banks, vast areas of palms and ferns will be encountered. The palms vary from the thick nipa palm, 5 to 8 feet in height, to the giant palms 70 feet in height. The fern like type of palm favors those areas that are covered with water continuously, while the giant palms favor those areas that are covered only part of the year. Undergrowth

Figure 3. Fern swamp.

in the areas of the tall palms varies from dense to scattered small shrubs and bushes. Generally movement is restricted to the column.

e. Large trees that form a closed canopy at heights from 80 to 150 feet will occupy the areas slightly above swamp level to the top of hills. Under this canopy are additional canopies of trees of various heights. Most of the daylight is blacked out, and the forest floor is dark with a matting of decayed vegetation. Undergrowth varies in density but in general movement will be restricted to the column. Shrubs, bushes, small trees, and ferns interlaced with vines will exist in various density. There are many great flange-rooted trees that are 5 to 8 feet through the stump. The flanges 5 to 6

in number flare out from the trunk at 4 to 10 feet above the ground. They are 4 to 7 inches thick and extend out several feet above the ground forming walls that are compartments of the ground area around the trunk of the tree.

f. A dense thicket of shrubs and small trees will occur along the shallow banks of wide rivers and streams that do not overflow their banks. In the rocky stream beds, thickets of fern-like shrubs will occur.

g. On hills and mountains, tall trees with straight trunks branching out only at the top will form the upper canopy. The height of the trees will decrease on mountains of high elevation. Smaller trees will form additional canopies at various heights. In between the trees small shrubs and bushes will occur with the undergrowth denser along the steep slopes since the steep grades tend to reduce the completeness of the main canopy thereby permitting sunlight to penetrate during the early morning and late afternoon. When the underlying surface is too rocky, larger trees finding it difficult to strike roots, will fall but continue to grow in this position. Thus one can find living log jams on high ridges rendering an otherwise useful route, virtually impassable.

h. Savanna grasslands, the tropical equivalent of the prairies of the temperate zone, are characterized by extensive areas of grass ranging in height up to 12 feet or more, with scattering of low trees and small forests along the water courses. Generally, savanna grassland increases

Figure 4. Savanna grasslands.

as we depart from the equator into areas of prolonged dry seasons. Movement through the savanna will be slow and difficult with visibility practically nonexistent.

i. Secondary growth has exhibited itself in all major jungle areas and has modified vast areas of vegetation. Many abandoned agricultural clearings are now occupied by dense, fully developed secondary growth consisting of shrub, thorned vines, bushes, trees, and various other types of vegetation that were previously checked from growing by the lack of sunlight. Shifting cultivation of crops in the temporary areas is widespread in the jungle resulting in extensive areas of dense secondary growth. Movement in secondary growth

Figure 5. Secondary growth.

areas is extremely difficult and slow, requiring extensive cutting.

9. Weather

a. The jungle weather is usually hot and humid, characterized by sudden changes. Within a short period of time, hot clear weather may change to a torrential rainfall that is brief and frequently violent, characterized by thunder and lightning. With equal suddenness, the rain may cease and the sun will shine. Maximum relative humidity is caused by the heat of the tropical sun evaporating large quantities of water from lakes, rivers, and streams.

b. Generally, along the equator, we find a con-

tinuous rainy season. As we depart from the equator, we begin to have a distinct wet and dry season. The dry seasons become prolonged as we reach the outer margin of the tropical areas or the jungle. The area located within the 25° north and south of the equator is referred to as the wet tropics, but the tropical areas extend to approximately 30° north and south of the equator.

c. Seasonal changes are noticeable in the jungle but not pronounced. Although the weather is usually hot and humid, it can be cool and even cold during the nights. Annual rainfall will be greater on the windward side of a continent or island than on the leeward side.

10. Plant Life

Plant life as a form of food for survival exists in the jungle. Wild fruits, nuts, and edible plants exist in great numbers and variety. A vast number are edible although some are more palatable than others. Plants are more common than animals and are easier to obtain. Plant life varies throughout the jungle world and personnel operating in such areas should make an extensive study of the edible plants of the area. For a complete discussion of plant life, see TM 10–420 and FM 21–76.

11. Animal Life

a. Animals which are dangerous to man are the exception and will rarely be seen in the jungle. Normally they will flee from man but when cornered or wounded, they may attack and even kill.

All family groups of the animal kingdom will be represented with some groups numbering thousands in different species.

b. Common to the ear of the jungle soldier will be the many weird calls of small birds, large parrots, monkeys, and cats. The jungle will hum with the sounds of thousands of different types of insects and will be crawling with various sizes of ants, lizards, caterpillars, and butterflies.

c. There is altogether too much fear of snakes on the part of the soldier without jungle experience. The wide spread fear of "the snake infested jungle" is an entirely imaginary picture. Poisonous snakes will be encountered in most of the jungles of the world, but not as frequently as pictured. The soldier's inherent fear of snakes reduces his efficiency in the jungle to a great extent. It is important to remember that relatively few people die from poisonous snake bites.

d. There is no dependable rule by which a venomous snake can be distinguished from a harmless one at a distance, so all snakes should be treated as poisonous. The most effective repellent for snakes in a bivouac area is common sense and cleanliness. An area littered with food and open containers will attract small vermin which in turn will attract snakes. Strict policing will discourage noxious pests and snakes.

12. Natives

a. General. Native inhabitants of jungle areas can be of valuable assistance to military forces if

their attitude is friendly and their cooperation is cultivated. A commander should take early measures to ascertain the sentiment of natives. Once their friendly attitude is established, he should attempt to avail himself of their assistance.

b. Employment of Natives. Friendly natives may be employed as scouts, guides, carriers, rear area litter bearers, and laborers. Natives are also valuable sources of military information. In some cases they may form their own fighting groups. These forces, although limited in military experience, have the advantage of detailed knowledge of the terrain and may be useful for scouting, raiding, and harassing enemy communications. The use of native troops, organized and controlled by the commander, will decrease objection to the presence of our forces.

c. Languages. Native languages vary widely. Local interpreters are usually available. Pidgin English or sign language can be utilized to lessen the language barrier. Natives may be experienced fighters but may be bewildered by the weapons of modern warfare. Reports of natives concerning the size, armament, formation, and equipment of the enemy must be carefully evaluated and verified.

d. Dealing With Natives. Dealings with the natives should be through a proper agent, such as a colonial administrator or head man of the district. Agreements relative to employment, pay and rewards should be made through the desig-

nated agent. This agent should be carefully consulted as to native religions, superstitions, and customs. Local rules and customs should be respected. Natives must be paid a fair price for everything purchased from them in accordance with the medium of exchange of the locality. Individuals should not be permitted to barter or trade with the natives unless approved by the agent. In dealing with natives the following actions should be taken:

(1) Be friendly, but cautious.
(2) Be courteous.
(3) Respect their customs, religions, and personal property.
(4) Give them gifts.
(5) Do not threaten.
(6) Do not molest their women.

13. Psychological Adjustment

The psychological adjustment of the individual must be considered. Many individuals have an inherent fear of the jungle. They have preconceived notions about the wild animals, reptiles, insects, and wild life in general. The individual must be taught to overcome this fear and gain confidence in his ability to live, move, and fight in the jungle through training. Training programs based on individual training and carried through to unit training will indoctrinate individuals in the techniques of jungle fighting and the ability to sustain himself in jungle operations.

Section III. MILITARY CHARACTERISTICS

14. General

The jungle vegetation, swamps, rivers, streams, and broken ridges hinder movement. An enemy can be expected to take full advantage of these natural obstacles in planning defensive positions and supplementing them with man-made obstacles. A maximum use should be made of available intelligence terrain studies to determine the military characteristics of an area.

15. Critical Terrain

Critical terrain features in the jungle include defiles, trails, roads, rivers, coastal areas, villages, built-up areas, and high ground. High ground loses its importance in jungle operations due to the limitation on observation and visibility. Objectives will be difficult to identify and observe due to the dense growth of trees and thick undergrowth with interlacing vines.

16. Routes of Communication

Routes of communication in the jungle are meager or nonexistent. Good roads seldom exist initially. Trails are narrow and generally poor. Routes of supply must be cut out of the jungle and maintained under the most difficult conditions. Rivers may also be utilized as routes of supply if available. Supporting weapons are often limited initially to 81mm mortars, machineguns, and 3.5-inch rocket launchers, since the heavier weapons cannot be moved forward until roads have been constructed or improved.

17. Observation

Observation by air will be obstructed by the jungle canopy and generally restricted to large rivers, villages, and other built-up areas. Observation on the ground may be limited to as little as 5 feet, making it difficult to select good observation posts. Concealment is always available. Large forces can maneuver without being discovered and patrols can pass within a few yards of each other without discovery.

18. Positions

Sites for indirect fire weapons are difficult to obtain. They must be cut out of the jungle and will be small and compact. Fields of fire for direct fire weapons must be cut in the form of tunnels to preclude detection.

CHAPTER 2
JUNGLE TRAINING

Section I. GENERAL

19. Introduction

Jungle training is necessary to prepare individuals and units to fight and live effectively in jungle environments throughout the world. Training guidelines enumerated herein may be applied to jungle-type terrain (woods, rivers, swamp areas) in order to capitalize on available facilities and time prior to an actual tactical movement to a jungle area in preparation for training or combat. Training should be presented progressively.

20. Training Objectives

a. The initial objective of jungle training is to mentally and physically prepare the individual to the jungle environment. It should include: psychological conditioning of the individual to eliminate fear and encourage understanding of the jungle; acclimation to weather, climate, and temperature changes.

b. The second objective is to train individuals and units in jungle operations. Emphasis is placed on techniques and tactics common to the jungle; need for decentralized control; importance of small unit actions; accentuating initiative, bold-

ness, and determination on the part of commanders and self-reliance on the part of the individual soldier; teamwork and control. The training should range from movement and survival of the individual soldier to the combined arms and services type operations.

21. Training Qualifications

Training is conducted at appropriate jungle warfare schools to prepare cadre of NCO and officer personnel and other selected personnel for qualifications in small unit jungle operation. The pursuit of this course along with appropriate study of current jungle operation publications will facilitate initiation of jungle training of conventional infantry units at any military station.

Section II. INDIVIDUAL AND UNIT TRAINING

22. General

This chapter outlines the most important individual and unit training for jungle warfare. The following subjects require additional emphasis in order to properly prepare a conventional trained individual or unit for jungle warfare.

23. Navigation

Successful navigation is dependent on proficiency in map reading and the use of the compass. Personnel expecting to operate in jungle terrain should have a thorough and complete knowledge of military map reading as set forth in FM 21–26.

a. Land navigation is one of the important types of special training for jungle operations. Vegetation is a major obstacle to jungle navigation, as it hinders movement and the observation and identification of landmarks. Available maps can seldom be relied upon for accurate location of trails, roads, villages, and streams. Although maps of jungle areas are fairly accurate, they exclude small hill areas, draws, streams, and other natural objects. For this reason, it is easier to find oneself on the map by direction and distance traveled, or by finding a prominent feature on the map and ground and moving to that area. Resection, intersection, and ground orientation are extremely difficult in the jungle, due to the limited distance of visibility. The use of the map takes on added significance in the jungle. Don't lose time trying to orient yourself on the ground unless on a prominent terrain feature. Remember distance and direction traveled is the easiest way to keep oriented on the map.

b. Care must be exercised in using existing trails when the situation permits. A thorough map study must be made prior to starting on a mission. It is usually safe to assume that trails exist between villages, even though not shown on the map. The following procedures will greatly aid a unit to navigate through the jungle successfully.

(1) Obtain a map that is marked with the current data from all existing sources.

(2) Select the following navigational personnel for each column:

(*a*) Guide—Performs the duties of clearing and marking the trail and aids the leader in maintaining proper direction.

(*b*) Leader—Maintains direction with the compass, reads and corrects the map and supervises the actions of the other two members.

(*c*) Pacer—Keeps an accurate count of the distance traveled.

(3) A navigational team as organized above is capable of moving rapidly with no difficulty of control in the jungle provided no resistance is encountered.

(4) Because of the extreme unevenness of the terrain, detours, obstacles, and the doubtful validity in the jungle of maintaining a measured pace, it is recommended that the pacer add one-third of the distance to be covered to arrive at a total distance to travel.

24. Machete

a. General. Primary importance is given to the proper use and care of the machete. The machete is the most effective tool for cutting through the jungle and an effective weapon when silence is imperative.

b. Proper Use. The machete is a cutting instrument that depends on velocity and angle rather than weight for its effectiveness. Maximum velocity may be obtained by gripping the machete

firmly with the thumb and two fingers and loosely with the last two fingers. Swing the machete with a whip-like motion using the wrist and fingers to attain maximum velocity with the machete. Just before the blade strikes the target, tighten the last two fingers of the hand, giving added strength and velocity to the blade. The blade must meet the target at an angle of 45° for maximum effectiveness. A lesser angle will result in a glancing blow dangerous to the operator and persons nearby. A greater angle will cause the blade to bounce, resulting in a minimum cut. Slant all blows away from the body to the left or right. Vertical blows with the machete should never be made. Before cutting always insure that all personnel and foreign material are cleared from the area. Sheath the machete when not in use. If it is necessary to carry the machete unsheathed hold the reverse of the blade edge just forward of the handle. Hold the point to the front. Although these are fine points many injuries are caused every year in the jungle because these safety rules have been ignored. Cutting in the jungle must be held to a minimum, to avoid detection by sound or tracking. Excessive cutting can cause a large unit to be destroyed by a small enemy force.

c. Care.

(1) Sharpen whenever necessary. Sharpen the machete to a tapered thin edge for jungle use. Use of a grindstone, whetstone, file, or smooth stone is recommended. Care should be exercised in

using a grindstone to avoid overheating the blade as this will cause the metal to lose its temper.

(2) A heavy oil or grease should be used to prevent rust and the handle should not be notched or wrapped for the roughness will cause blisters to the hand.

(3) Care should be taken that all broken or cracked handles are immediately replaced or repaired to preclude accidents or blisters.

25. Camouflage

The jungle affords superior camouflage and concealment. In jungle warfare camouflage is a special concern of the individual. Care must be taken to avoid excessive cutting. Clear only foliage and underbrush that is absolutely necessary. For camouflage principles and techniques refer to FM 5–20.

26. Bivouacs

a. The type bivouac area established in the jungle will be governed by the tactical situation. In establishing bivouac areas the perimeter defense is used. Bivouac sites should be on high ground near a source of fresh water to avoid disease bearing and nuisance insects and to take advantage of better drainage and any existing breeze. The bivouac area should be established with an inner and outer perimeter combined with a system of listening posts. Patrols are sent out during day-light hours on all existing trails to

determine if the enemy is present or has recently been in the vicinity. During hours of darkness, warning devices are established outside the perimeter at a sufficient distance to provide timely warning of the presence or approach of the enemy.

b. Native villages and immediate surrounding areas should be avoided as bivouac sites. The unsanitary condition of most native villages will expose the troops to disease. Some natives may be unfriendly and the possibility exists that the enemy may have the populated areas under observation.

27. Jungle Hints

a. General. This paragraph deals with the various means of utilizing materials readily available in the jungle and equipment issued to gain greater comfort and other hints which will aid the individual to survive in the jungle.

b. Shelters. Whenever the tactical situation permits, the individual should be encouraged to construct shelters that will permit him to sleep off the ground. Enumerated below are some of the different types of shelters that may be constructed utilizing jungle materials and equipment issued.

(1) Improvised hammocks may be made of blankets, pieces of canvas and shelter halves.

(2) A temporary type of shelter may readily be constructed by planting four forked poles firmly in the ground with the forks approximately 1 foot above the ground.

Lay a frame of 2-inch poles in the fork and fill in this frame by laying thinner poles across it. Fasten the poles together with vines or strips of bark. Pitch the shelter tent and mosquito net over this shelter. The width and length of this shelter is dependent on the size of the individual to occupy it. If four sturdy trees spaced in the desired length and width of a shelter are available, they can be notched to take the place of the forked poles and used as the supporting frame for the bed and overhead cover.

(3) The above shelter can be made into a semipermanent type shelter by using palm fronds as a waterproof roof.

c. Food.

(1) Food for jungle service should be selected to give maximum food value with a minimum weight. Cooking utensils are hard to keep free of bacteria, and cooked food can become contaminated while being delivered to the troops. Foods should be limited to those which are ready to eat with little or no cooking.

(2) All soldiers should learn to cook rice, a staple of most oriental diets which will usually be contained in the captured rations of oriental armies operating in a jungle.

(3) Waterproof food bags are designed to carry dry rations under humid condi-

tions. These bags are made of high grade coated materials and should be retained for reuse. Ration containers protect their contents from insects and from contact with humid air; however, this protection ends (even for dry foods such as milk powder and dried fruits) as soon as the containers are broken or opened. All wet or damp foods must be eaten immediately after opening the containers. Dry foods may be kept for several days, provided they are placed in waterproof food bags, and the bags securely closed.

(4) Clean food is essential to the health of a command. Adhere to the basic rules of personal hygiene and sanitation. If it is necessary to eat food cooked by natives, be sure to eat it as soon as it is prepared and while it is very hot. Indigenous laborers should not be employed in military messes because of varying standards of personal hygiene and their usual lack of immunization. Cook all meats until their are thoroughly done. Remove the skin of any fruit before eating. Do not bite through the skin.

d. Expedient Cooking Utensils.

(1) Generally, the only utensils available to small groups are empty ration cans, canteen cups, or the soldiers' mess kits. Cooking utensils need include only a

spoon and a metal container for boiling. The canteen cup is useful both as a cooking and eating utensil. Most food obtained in the jungle can be cooked over an open fire.

(2) If bamboo is available, a section of green stem cut below two successive joints will furnish a container closed at the bottom and open at the top. This will make a suitable vessel for improvised cooking. Green bamboo is so durable that water may be boiled in it. A closed section of bamboo split down the center makes excellent eating tray.

(3) A coral stone or porous lava stone is very useful for grating food. A splinter of bamboo makes a sharp knife for cutting food.

(4) Almost any food may be roasted merely by placing it in hot embers or broiled by holding it over a hot fire with a stick.

(5) A ground oven is easy to make. A shallow pit should be scraped in the earth, kindling is put in the pit and then some larger firewood. Stones are placed on top of the firewood and then the kindling is set afire. When the stones have been heated as much as possible, the food is then covered with leaves or bark; placed on the stones and covered with earth or sand. The time required for cooking depends on the size of animal being cooked.

e. Medical Care.

(1) Soldiers must be thoroughly familar with such first aid measures as control of bleeding, prevention of infection, prevention of shock, application of an arm or leg splint, methods of evacuation, artificial respiration, etc., under field conditions, to aid in the saving of life. Disease prevention is a must as many diseases are prevalent in jungle areas. Personal hygiene and military sanitation, to include such items as care of the feet, care of clothing, use of insecticides, insect repellents and protective clothing and equipment; disposal of human and other wastes, are of extreme importance in the prevention and/or control of diseases.

(2) Snakebite. (See par. 25, FM 21–11.)

(*a*) Poisonous snakebites must be given immediate care. The bitten person should be not allowed to walk or run; he should be kept as quiet as possible. If you can, kill and keep the snake so that it can be identified and the proper antivenom serum given.

(*b*) If a snakebite kit is available, use it. It will contain a tourniquet, a knife or razor blade, antiseptic, and a suction pump. If a snakebite kit is not available, you must improvise.

(*c*) If a person is bitten on the arm or leg, apply a tourniquet a few inches above

the fang marks, i. e., between the bite and the casualty's body. Tighten the tourniquet just enough to make the veins stand out prominently under the skin. If the snakebite is on a part of the body other than an arm or leg, skip the tourniquet and proceed with the next step.

(*d*) If an antiseptic is immediately available, apply it to the area surrounding the fang marks. If none is on hand, do not wait for it!

(*e*) If a flame is available, sterilize the point of a knife or razor blade by holding it in the flame for a few seconds.

(*f*) Make a single cut over each fang mark. The cuts should be approximately ¼-inch long and ¼-inch deep.

(*g*) Apply suction to the wound. If a snakebite kit is available, use its suction pump. If none is available, apply suction by mouth, spitting the blood and other fluids out frequently. Snakebite poison is harmless in the mouth unless there are cuts or sores in the mouth. Even so, the risk is not great. Suction should be kept up for at least 15 minutes before loosening the tourniquet.

(*h*) After 15 minutes, release the tourniquet for 10 seconds. It should then be reapplied for 15 minutes, then re-

moved for another 10 seconds. Continue this procedure until medical care (doctor) is available. This procedure permits the body to receive and absorb any remaining poison gradually instead of receiving it all at one time, thereby allowing the body systems a better opportunity to counteract it.

(*i*) It must be remembered that medical aid is urgent in the case of poisonous snakebites. The casualty should be evacuated either lying down in a vehicle or by litter. After the tourniquet has been applied and the incisions made, evacuation should commence if means are available. Suction procedures can be easily accomplished during the casualty's evacuation by vehicle.

f. Jungle Expedients. Jungle expedients require both originality and forethought. The following suggestions will aid in the development of expedients by individuals and leaders.

(1) Carry matches in a waterproof container, or carry waterproof matches; otherwise, perspiration alone will often make them useless. Ordinary kitchen matches may be waterproofed by dipping the head in melted candle wax.

(2) Carry a light hook and line or a light gig, such as a spear with barbed points, for fishing. Stunning fish with a stick of

explosive is the quickest and surest way of getting a good catch, but a battery powered telephone may also be used by dropping the wire lead into the water and cranking the phone vigorously.

(3) Most mud or other solids in water can be removed by straining the water through a cloth. Stirring a small amount of alum into the water causes the solids to settle. If the water is used for drinking, the water must then be boiled or otherwise purified.

(4) Know how to find water. Small amounts can be found in certain plants. Sand breaks in a coral reef often indicate fresh water several feet below the surface. See FM 21–76.

(5) Do not attempt to travel at night unless necessary. Halt early enough to make camp. If the tactical situation permits build a fire and collect plenty of fire wood before darkness.

(6) To build a fire in wet weather, first select a spot for it that is sheltered from the rain. Split out the heartwood of dead limbs or trees to start the fire. Start a small fire initially and build it up gradually.

(7) Edible fruits can usually be identified by signs of animals having eaten them.

(8) All fur bearing animals, birds, and snakes are edible. Insure that all game

is freshly killed and inspect them for signs of disease prior to preparation.

g. Effects of Heat.

The effects of heat can often be prevented by keeping living and working quarters as cool as possible; by keeping the head and body covered when in the sun; by wearing light, loose-fitting clothes; by taking plenty of salt with food; and by drinking enough water.

(1) HEAT EXHAUSTION results from excessive loss of water and salt from the body. This condition is caused by heavy sweating. Symptoms of heat exhaustion are dizziness and faintness; signs are paleness and moist, cool skin. For first aid, lay the casualty down in a shaded area, loosen his clothing, and give him cool salt water to drink if he is conscious. (Prepare the salt water by dissolving 2 crushed salt tablets or ¼ teaspoonful of table salt in a quart (or canteen) of cool water. The casualty should drink 3 to 5 canteenfuls in 12 hours.)

(2) HEAT CRAMPS occur when a person has been sweating a great deal and has not been taking extra amounts of salt. He may be seized with muscle cramps, especially of the intestines, abdominal wall, arms, or legs. Frequently, he vomits and is very weak. Give him large amounts of salt water as in (1) above.

(3) HEATSTROKE, a very serious condition

with a high death rate, is characterized by very high body temperature and unconsciousness. In hot surroundings a stoppage of sweating with hot, dry skin should serve as a warning. The casualty is bright pink in color and may become delirious. The single, most important objective in treatment is the lowering of his body temperature as rapidly as possible. The best way to do this is to immerse him in a cold water bath containing ice. If ice is not available, use the coldest water you can get. If a cold water bath cannot be provided, get the casualty into the shade, remove his clothing, and keep his entire body wet by pouring water over him. Cool him by continuously fanning his wet body. Get medical aid! And remember— cooling of the casualty's body must be continued even during his evacuation! When the casualty becomes conscious, give him cool salt water to drink as in (1) above.

CHAPTER 3
OPERATIONS

Section I. GENERAL

28. Preparation

Operational preparation for jungle combat must be related to the conditions existing in the theater of operations. These conditions result from the combined effects of climate, terrain, distances, poor communications, prevalance of disease, and restricted visibility.

29. Standing Operating Procedure

In order to facilitate jungle operations, a detailed standing operating procedure should be prepared by applicable units. The standing operating procedure should cover the organization of combat teams from reinforced rifle platoons to the combined arms task force of battle group size. This SOP may include supply procedures, bivouac and shelter preparation, march rate, and formation. As seasonal weather changes will affect operations, such deletions, substitutions and modifications of equipment and organization are made as required. A list of jungle survival aids common to most jungle areas may be included.

Section II. MOVEMENT AND MARCHES

30. General

Movement in the jungle is calculated in terms of time rather than distance. In the early stages of a jungle campaign, road nets may be limited or nonexistent. Cross country movement is slow and difficult; therefore when the situation permits, existing trails and stream beds should be used.

31. Support

The difficulty of movement and the weight of equipment, weapons, and supplies decreases the speed and effectiveness of the supporting arms and services. This forces the foot troops to reduce their speed accordingly. Tanks may be used against definitely located targets, where the terrain permits. Small tank units may be attached to infantry units for the reduction of enemy strong points.

32. Factors Affecting March Rate

a. For the general principles of foot marches, and a detailed discussion concerning jungle marches, see FM 21–18.

b. The rate of march will depend on the type of jungle to be traversed, the availability of trails, and the formation and security elements to be employed. When calculating the rate of march, the march distance, number of obstacles to traverse, the physical condition of troops must be assessed.

c. Commanders must be constantly on the alert to keep the rate of march and the length and number of rest periods in line with physical endurance of the men. Extreme temperatures make frequent halts almost mandatory. The heat and humidity are factors which will affect every march to an unpredictable extent. For detailed discussion on adverse affects of heat see FM 21–11.

d. Animals accompanying a column of foot troops can be expected to maintain the same rate of march. However, animals should not be kept under pack for more than 8 hours a day, and should be allowed sufficient time for care and feeding.

e. Resupply may be performed by parachute drops, transport helicopters, and in some cases free fall drops, allowing the troops to travel lighter and faster than would otherwise be possible.

33. March Discipline

a. March discipline is made difficult by the problems of control. Dense vegetation which greatly restricts mobility and observation, presents a serious obstacle to effective control of any type of movement through the jungle. To get troops to the proper place at the proper time in condition to successfully accomplish the mission requires the utmost in ingenuity and leadership of the commander.

b. Diffculties of control due to lack of direct observation of the major portion of the march column must be offset by reduced distances and

intervals between individuals and units, and added responsibility on the small unit leaders. Definite march objectives must be assigned and each unit leader must be acquainted with the complete march plan. Although control is more difficult when moving a unit by two parallel, yet separated columns, speed and execution of march is facilitated. This formation keeps the unit more compact and better deployed for action than a single, strung-out column. As a means of communication and an aid to direction within the column, telephone wire may be laid by a forward element.

c. March discipline demands decentralization of control and aggressive leadership on the part of all unit leaders. Leaders must constantly check to insure the rate of march is maintained and that contact is not lost with other elements. To minimize the control problem, all men should observe the following rules of conduct:

(1) Prescribed distances and intervals must be rigidly maintained. To prevent lose of contact and the column from bunching up, the accordion action that occurs so often on a march must not be allowed.

(2) At halts, the men relax physically but they can never afford to completely relax mentally. The men must be kept alert by the constant checking by the leaders.

d. The company commander should march well forward in the column where he can control the movement and any tactical employment required.

He needs the capability to communicate with other leaders within the column.

34. Selection of Routes

a. The selection of usable routes is a difficult job. A straight line is rarely the most practicable way between two points, the commander should strive to select a route that presents the least amount of obstacles, and should plan the route in a series of legs from one march objective to the next. For secrecy, with time permitting, it may be necessary to select the most difficult route.

b. Maps should be used with caution. Old maps are often inaccurate and cannot be depended on for accurate trail routes. Trails change rapidly, and are often completely reclaimed by the jungle growth. Erosion, fallen trees, floods and land slides can rapidly render a trail impassable or difficult to follow. Patrols are the best source of information. Every patrol should be instructed to note, sketch and report all variations from existing maps. For fundamentals of sketching see FM 21–75.

c. Aerial photographs will seldom show trails in the dense growth, but aerial reconnaissance and photographs will often show salient features to terrain which can aid terrain evaluation and orientation. Helicopter scouting parties can be used to advantage in route reconnaissance. For a detailed discussion of aerial reconnaissance, see FM 1–100.

d. It is safe to assume that trails exist between

native villages, even though none appear on available maps. Natives will often blaze a trail, and troops should be taught to recognize those signs. In dealing with natives, it should be noted that a native will usually give an affimative answer to any "yes" or "no" question. "Where does this trail go?" will elicit a more accurate answer than "Does this trail go to so and so?"

e. When enemy contact is not imminent and speed of movement is important, existing trails and streams should be used. Streams may be utilized as trails if not too deep or swift, and a deep stream is one of the fastest and most dependable means of jungle travel when rafts or small boats are available.

35. Selection of March Objectives

a. March objectives are a series of intermediate objectives selected so that the march can progress from one position to the next until the final objective is reached. They should be terrain features recognizable on the map as well as on the ground.

b. March objectives should be selected from the map prior to starting the march, and they should be planned so the unit can move from one objective to the next in a prescribed period of time. This aids navigation and control by establishing a series of check points. These objectives may also be utilized as rallying points in the event of ambush.

c. A march objective selected for a halt must lend itself to the defense. An area considered for an overnight halt must be chosen with particular

care and it should lend itself to an all-around (perimeter) defense.

36. Night Marches

a. Any night movement in the jungle is affected by the dense vegetation and the thick canopy of trees which cause almost complete darkness. For this reason, night marches should follow well defined trails. However, this is not possible in all cases, as the situation may require a cross country move at night. Therefore, individuals must be trained to operate off the trail as well as on the trail. Control and night navigation require special consideration.

b. Night movement is characterized by slow and deliberate progress and it requires detailed planning. Movement on or off the trail can be greatly facilitated by the following expedients:

(1) The lead party may string phone wire and each man follow the wire, holding it in his hand.

(2) Have troops close up and hold onto the pack or belt or a rope tied to the pack of the man immediately preceding. This prevents straggling and infiltration of the column by the enemy.

(3) White engineer tape may be laid by the lead party.

(4) Luminous tape may be attached to the back of each man. Two strips, each the size of a lieutenant's bar, may be used to maintain the desired interval. Two

strips are used to increase depth perception.

(5) Each man may suspend his compass behind his back by string around his neck and allow the luminous dial to be visible from the rear.

37. March Security

a. Security measures employed in normal operation remain essentially the same in jungle operations except that distances between contact elements are reduced, and the measures are more intensified, due to reduced visibility. If a unit is operating independently, all-around security is mandatory.

b. Front security element must be well forward. They must scout the area in front and very carefully check out all danger areas prior to the arrival of the main column. Scout dogs, if available, should be utilized by the lead element. Care should be taken that scout dogs, when used, have sufficient security elements accompanying. For definition of danger areas, see FM 21–75.

c. Flank security in the jungle must be continuous. In dense growth, security elements must cut their own trails, and often cannot maintain a uniform rate of speed. When this is the case, they must be rotated frequently to avoid fatigue which may cause a letdown in the mental alertness of the men. The speed of a column is greatly reduced by the frequent changing of security elements. If flank security elements cannot be used,

due to the terrain or dense vegetation, individuals must be given specific directions of surveillance to cover those areas not otherwise covered. When crossing danger areas, flank security patrols must be utilized to cover the crossing. The patrols will then rejoin the last march unit after completion of the crossing.

d. During halts, the units move off the trail and form into a perimeter for the duration of the halt. Security elements are sent out in all directions not only to observe but to listen for enemy activity as well. At least fifty percent of the unit must be kept alert even during breaks. Due to the possibility of an enemy attack from any direction, halts should be ordered only when large portion of the column is on terrain that lends itself to an all-around defense. Halts for overnight bivouacs should be made with sufficient daylight remaining to adequately secure the bivouac before darkness.

Section III. COMBAT INTELLIGENCE

38. General

a. The operational techniques used in the production of combat intelligence in jungle warfare are consistent with established procedures. In the direction of the collection effort, extensive patrolling action will be necessary due to limitation of other sources normally available to the intelligence officer. An evaluation of information for creditability and accuracy, particularly

in regard to patrol reports, assumes increasing importance along with careful considerations as to how the information was actually obtained, (i. e., by observation). Limitation to normal sources of information and analysis of enemy capabilities warrant special consideration.

b. Map coverage of jungle areas is limited. Due to the rapid changes in jungle growth and inaccessability of many areas, there will be some inaccuracies in the available maps; therefore, care must be taken to insure that the most current map available is used. Because of heavy vegetation and availability of natural camouflage material, aerial photos will not be of the same value as in operations in open terrain.

39. Weather Forecasts

a. Weather forecasts will be reliable in jungle areas due to the more apparent division between the two predominant seasons—dry and rainy, except in areas of equatorial jungle where there are no dry seasons. During rainy seasons, rainfall can be predicted with reasonable accuracy. The volume of rainfall is the most important factor. Two hundred inches of rain are not uncommon in a year. During dry seasons, it is not unusual for two or more months to pass with no precipitation whatsoever.

b. Visibility may be greatly restricted during rainy seasons, due not only to the rainful itself, but also to heavy ground fogs which may linger for several hours after sunrise. Light data which

could be used in less moist climates may be of less value under such circumstances.

c. Absence of wind in areas of dense forest or undergrowth will have a marked effect on the employment of smoke. High winds may not be felt in heavily vegetated areas since they tend to pass above the dense forest.

d. Temperature changes in mountainous jungle areas will sometimes range 40 to 50° over a period of 12 hours. The intelligence officers' analysis of the effects of this condition will be of value to all planning.

e. Trafficability varies with the location of the jungle area. Near large bodies of water, low ground may be constantly soft, even in the dry season, and may, therefore, be passable only to foot troops without improvement. Conversely, at higher elevations, trafficability may remain excellent throughout most of the year, becoming poor only during the worst part of the rainy season. At times, even when trafficability has been excellent, the volume of rainfall within an hour or less may completely halt vehicular movement and severely restrict foot movement.

40. Terrain Considerations

a. Critical Terrain. Critical terrain in dense areas includes trails, roads, bridges, and communcation centers. High ground is still selected as critical but for varying reasons. A hill may dominate the only feature in the area which affords an area for defense. A river through an otherwise impenetrable forest may be critical.

b. Observation and Fields of Fire. In dense jungle, of course, observation and fields of fire are both limited by the undergrowth. In the older rain forests, however, although good observation into the forest from the outside or above may be nonexistent, it is possible to have excellent observation and good fields of fire for fair distance at ground level. This condition is caused when the branches of tall trees interlace to form a canopy through which few sunrays penetrate, thereby prohibiting the growth of grass, bushes, or other foliage. Where old forests have burned or have been destroyed, the resulting tangle or undergrowth seriously limits both observation and fields of fire. In open areas, observation and fields of fire may be limited by the height of the jungle grass, which sometimes grows several feet over a man's head.

c. Cover and Concealment. Undergrowth, forest area, and high grass areas afford excellent concealment from observation and also limit the distance sound travels. It must be remembered that these advantages work for the enemy as well as for our forces. Artificial concealment-camouflage is very easy to assume. Soft ground in certain areas and the prevalence of revetting and covering material, make artificial cover easy to dig and conceal.

d. Obstacles. Many natural obstacles exist within the various types of jungle area. In the older forests there is generally no obstacle to foot movement other than incidental swampy areas and oc-

casional fallen trees and vines, but the trees themselves, depending on their spacing, and the moist ground, may act as obstacles to heavy or continued vehicular movement. Manmade obstacle are often more effective in jungle areas than in normal terrain, due to the limited communication routes. A log barrier across a trail or a protected mine field across a road may cause a marked increase in the delay to the opposing force and may require a greater amount of effort for its removal or the preparation of a bypass.

e. Avenues of Approach. Suitable routes, in the sense of good observation, field of fire, use of critical terrain, cover and avoiding obstacles, may be virtually impossible to find. A compromise must be made because of the limited existing routes. The cutting of new trails and repair of those already in existence are constant tasks. In his selection of avenues of approach available to the enemy, the S2 should consider no portion of the jungle area as impassable, no matter how difficult or thick.

41. Consideration of the Enemy Capabilities

The intelligence officer must be cautious not to be lulled into a false conclusion that the enemy cannot attack through supposedly impenetrable areas or that he cannot reinforce in time to affect our mission. The time to move from our present positions to an objective may take considerably longer through more difficult terrain than estimated, and the enemy may take advantage of this to reinforce with a unit considered too far away

to be used logically for that purpose. In addition, due to poor observation from both ground and air, the location of his forces, especially supporting weapons, is quite difficult to determine.

Section IV. OFFENSIVE COMBAT

42. General

a. Jungle terrain lacks the unity characteristic of offensive operation in other, more navigable terrain. The operations become a series of decentralized small unit engagements. Subordinate unit commanders must exercise initiative and be allowed freedom of action in executing a mission.

b. Commanders at all echelons apply tactical principles and modify them based on evaluation of the mission, enemy, terrain and weather, troops, and fire support available (METT).

c. Types of offensive operations in the jungle are normally restricted to envelopments and penetrations. Envelopments are executed where possible, often in conjunction with penetrations, to minimize enemy attention to enveloping forces. Airmobile attacking forces (especially using helicopters) are useful in executing envelopments in the form of surprise attacks and flanking maneuvers. Infiltration tactics and techniques take on increased emphasis for opposing forces because of the visiblity restrictions imposed by jungle vegetation. For further tactical considerations in ground and airborne maneuvers, see FM 7–10 and FM 7–40.

43. Movement to Contact

a. The movement to contact is often restricted to a file, even for large sized units, unless trails are cut. Flank protection for moving columns is difficult and security forces work at greatly reduced distances. The rate of march is governed by the nature of the terrain and vegetation. In the jungle, time factors will be increased and space factors decreased.

b. The commander places his supporting weapons well forward. When the position of the enemy has been determined and contact is imminent, the final stage of the movement is made. The advance is by bounds, from one terrain feature to another. Skirmish lines are rarely used by leading elements until contact is made.

44. Attack

a. Planning.

(1) The plan of attack includes the scheme of maneuver and plan for fire support. In the jungle, attack plans may include as required the seizure of a communication complex, a resupply base, critical port facilities, navigable routes through an otherwise impenetrable jungle, an inland navigable waterway, commanding terrain, and enemy forces. A commander makes his decision for his attack after a careful analysis of the factors of METT. For detailed planning in offensive combat, see FM 7–10 and FM 7–40.

(2) Battle group attack plans may include a variety of tactical maneuvers, varying from a tedious, single-file movement through an almost impenetrable rainforest to relatively fast movement by multiple columns in savanna like open country. Flexibility in attack planning may be attained by combining the features of a foot-mobile penetration and an airmobile envelopment to achieve decisive results. Regardless of the scope of the mission, attack plans must be simple and emphasize decentralized control of units and execution of orders, encourage tailored, hard-hitting, quick-moving combat formations and exploit all means of fire support.

b. Conduct.

(1) Based on the information obtained from reconnaissance, the commander decides on the point and direction of attack; preferable the enemy's flank or rear. If time is limited, it may be necessary to start his attack without complete reconnaissance. It may take hours or days for the attacking force to reach an assault position. A small enveloping force in the enemy's rear and astride his supply trail may cause him to withdraw.

(2) The enveloping force moves to its assault position in one or more columns. The attack is conducted with a formation

similar to that used in a night attack. Distance and intervals are reduced and the column formation is maintained as far forward as possible.

(3) Fire support is as essential in the jungle as in open terrain. Unsupported infantry ordinarily cannot breach a defensive position without incurring heavy casualties. The area to be breached must be pinpointed. Artillery and mortar forward observers may have to approach within extremely short range of their own fires. If there is the likelihood of confusing the registering rounds of units, the fire support coordination center (FSCC) can control the priority of units to register with smoke shells or sound sensing.

(4) During the assault, supporting fires should continue until they are lifted or shifted by the assaulting commander. They are then shifted to cover the specific targets that will most assist the progress of the assaulting force. Because of terrain and visibility restriction, an assault line, as such, is not normally formed. Rather, aggressive fire and maneuver by assaulting fire teams are conducted to overcome enemy resistance. Due to the difficulty in locating enemy emplacements by visual means alone, the fire and maneuver phase of the assault

may force the enemy to disclose his positions. As the enemy emplacements are located the fire and maneuver of the assaulting force generally move on a single axis with the fire concentrated on a selected and limited area of the enemy defensive perimeter. Smoke may be used to screen off the flanks of the area selected for penetration. The objective of the initial assault is to achieve a local penetration into the main battle position of the enemy. Once the penetration is made it is exploited until the objective is taken. Fire support and maneuver may be replaced by assault fire after the penetration when friendly forces are fanning out within the enemy battle position, if the terrain and situation permit.

(5) After the objective is overrun it must be secured immediately with a hasty perimeter. During this period personnel, should be especially watchful for tree snipers, an ever present danger in jungle combat. In jungle terrain the enemy may counterattack at any time and from any direction.

Section V. RELATED OFFENSIVE AND DEFENSIVE ACTION

45. Coordinated Attack Against a Fortified Position

a. When attacking a system of defended localities, it may be expected that heavy bunkers, pro-

tective and tactical wire, and antitank and antipersonnel mines will be encountered.

b. The enemy must be burned or blasted out of his bunkers and pillboxes. This requires a great amount of firepower. In attacks against positions of this type, the frontage must be narrow to insure the greatest possible concentration of fires. As in all jungle attacks, limited objectives must be established or control will be lost.

c. The preparatory phase of such attacks involve the construction and improvement of roads and trails behind friendly lines, the movement of supplies and ammunition, and the coordination of all arms and weapons that are to be used to support the attack.

d. If naval gunfire can be used to advantage, it should be requested and a schedule of the fires planned in advance. A naval gunfire liaison team may assist in directing the gunfire by direct ship-to-shore communications.

e. Arrangements should be made for maximum artillery preparation and continuing artillery support. The artillery may require several days for displacement to new and better positions and registration.

f. Forward air controllers make ground reconnaissance, employing all possible means to locate accurately the targets for preparatory bombing and strafing attack.

g. Continuous air-photo reconnaissance provides stereopairs for daily study. Terrain or sand

table models of the area to be attacked are excellent aids in briefing leaders.

h. Every attempt should be made to capture prisoners for questioning before the attack. The close jungle terrain favors an ambush and small patrols can ambush enemy parties on trails. A steady flow of prisoners at all times is highly desirable for intelligence purposes.

i. Patrolling must be continuous and an aggressive attitude must be maintained. Constant patrolling secures information, keeps the enemy on the defensive, inflicts casualties and limits his patrolling.

46. Observation Posts

The terrain and the poor visibility cause the establishment of observation posts with desirable characteristics to be extremely difficult. The dense vegetation and the thick canopy of trees overhead will at times reduce observation to a few feet. The type of observation post established in other terrain is usually ineffective in the jungle. Good fields of vision are difficult to find. The observation-listening post is used in jungle combat since much information of the enemy is provided by sound. Observation-listening posts are established by all units. It is necessary to have overlapping fields of vision and hearing. Individual soldiers in front line positions must be trained to observe, listen, and report enemy activity.

47. Patrolling

a. For the principles of patrolling and the de-

tailed instructions concerning the operations of patrols, see FM 21–75.

b. The size of a patrol varies with each mission assigned and should include only the number of men necessary to complete the mission successfully. A patrol may consist of from two to three men, up to a company. The larger patrols are used primarily to establish patrol bases from which smaller patrols operate. (See par. 61.)

c. A basic principle of jungle patrolling is to guide on roads or trails, but avoid their use. The enemy will usually place automatic weapons fire on these routes and establish listening posts near them. Jungle patrols ordinarily use the column formation because paths are so restricted. Dense jungle growth often prevents the dispersion of the flanks needed for security. Because security is in depth with little or none to the flanks, it is necessary to send security elements as far forward as practicable to avoid being ambused. At halts, flank security is obtained by sending elements to the limit of visibility in all directions.

d. A patrol can sometimes choose an indirect route to an objective that will allow it to move more rapidly than the more direct route that goes over dense terrain or through swamps. It is not always possible to guide on prominent terrain features. The compass must be relied on to an unusual degree. All members of each patrol should be equipped with the compass and be well qualified in its use. Maps are indispensable for jungle operations, even when they contain minor inaccuracies.

Personnel must be proficient in reading maps and aerial photos.

e. The equipment needed by a patrol varies with each mission, but it should be kept to a minimum. One machete is often enough or all that can be used at one time for cutting trail. Cutting must be kept to a minimum to avoid detection.

Section VI. DEFENSIVE COMBAT

48. General

Defensive combat in jungle terrain does not differ in principle from combat in other types of terrain. For principles governing defensive combat, see FM 100–5, FM 7–10.

a. The extent to which a defensive position is developed requires an understanding of jungle characteristics. There are no impenetrable jungles, impassable swamps, unfordable rivers, or unscalable cliffs and the commander must not assume that his command is protected by such barriers. Because of the heavy vegetation and dense undergrowth, observation and fields of fire are restricted. Commanders at all levels must make a thorough terrain analysis of any area they are to defend.

b. The degree to which a defensive position is prepared depends on METT, the availability of logistical support, and the requirements of time and space in providing such support.

c. Thorough and continuous ground reconnaissance is necessary because of the limited effective-

ness of security elements and the concealment from air observation afforded by the jungle. Dense jungle imposes severe limitations on the defensive use of weapons because observation is often limited to a few yards. These factors along with restriction on maneuver and control, place the greatest emphasis on planning, coordination, and small unit leadership.

49. Organization of the Ground

a. The principle of perimeter defense is used. The limited fields of observation allow the enemy to approach the position without being detected. Infiltration is easier and there is greater danger of attack from any direction. The proper use of listening posts and warning devices can reduce this hazard to a minimum.

b. The battle group and smaller units often operate as independent units. When operating alone, units must prepare to defend against enemy attack from any direction. The extent of all-around defense depends on the type of operation, the unit involved, the terrain and the vegetation.

c. When possible, one or both flanks should rest on a natural obstacle such as a river, lagoon, swamp, steep cliff, or the sea. While such features constitute obstacles to the attacker, they are never considered as insurmountable barriers and provisions must be made to meet with fire the enemy who attacks over them.

d. Mutually supporting defensive positions are established whenever possible. Limited fields of

fire and limited observation may make it difficult to establish such positions. If this is the case, then a shoulder to shoulder perimeter defense is desirable because it closes the formation to such an extent that enemy infiltration is difficult.

e. The first step in organizing the ground is to place the automatic weapons and prepare the fields of fire. Primary and alternate positions are constructed.

f. Camouflage is continuous and strict camouflage discipline is observed. Vegetation is not cut unnecessarily and the cutting is carefully planned and controlled by leaders. Instead of clearing open fields of fire for automatic weapons, fire tunnels should be cut. The standard open fire lanes tend to disclose the automatic weapons, but fire tunnels make such positions difficult to locate.

50. Security and Surveillance Measures

a. Security is planned to gain early information of the enemy's approach. Patrols, sentinels, observation posts, listening posts, and combat outguard are used. These outguards form the nucleus of the combat outpost system along critical jungle approaches. They give early warning of the enemy and within their capability delay, disorganize, and deceive the enemy as to the true location of the FEBA.

b. Trip wires connected to rattlers, antipersonnel mines, or illuminating flares may be installed around the position at night to warn of the enemy's approach. Other means may be used to

illuminate the battle field at night; cans filled with jellied gasoline with a remote system of ignition may be placed in strategic areas and ignited when the enemy approaches. Such devices should be located far enough beyond the position so that the light will not blind the defenders or disclose their positions, yet close enough not to be obstructed by the vegetation. The effect of all illumination is limited by the heavy foliage and the tree top canopy of the jungle. Additional means to provide surveillance (which thereby enhances security) include radar and infrared devices. Detailed planning and coordination must be affected by all commanders sending out night patrols. Plans include the mission, time of departure, time of return, routes to be used, sign and countersign, and emergency signals. Patrols' plans are sent to the next higher headquarters and to the direct support artillery headquarters for coordination with adjacent units and security elements forward of the main battle positions, and with supporting artillery fires.

51. Conduct of Defense

The defense of a perimeter is conducted as in any other type terrain. See FM 7–10 and FM 7–40.

a. Long-range fires are planned and executed as in any other type of terrain, conforming to the desires of the commander and the availability of ammunition.

b. Close defensive fires are planned and fires to

destroy the integrity of an enemy's forces before he launches his assault; and the artillery, mortars, and crew-served weapons within range of enemy forces can support the troops on the main line of resistance.

c. Units whose defense areas are not under attack or whose weapons are not required to fire in support of areas which are under attack, discipline their fire to prevent disclosure of their positions. The decreased frontage, shorter distance, and closer intervals between units in jungle operations call for extensive and detailed planning for fires. Listening posts are established in fighting holes along the outer edge of the perimeter defense. Two-man fighting holes are preferable to a one-man fighting hole because they allow the occupants to take turns at observing and listening and provide a two-man fighting unit. Individuals must be disciplined not to talk or smoke. Warning devices in the form of antipersonnel mines, trip flares, vines, ration cans, and grenades should be installed.

d. Plans are made and movements are rehearsed for counterattacks to restore position which might be penetrated by the enemy. Intense mortar and artillery concentrations in preparation for such counterattacks are planned. Counterattacks are launched before the enemy has had time to consolidate the position he has succeeded in taking. If the counterattack force must pass through another friendly unit close coordination must be made with the commander of the unit.

Section VII. RETROGRADE MOVEMENTS

52. General

When the tactical situation no longer requires a defense posture, a unit may receive an order to conduct a withdrawal from action to initiate an offensive or defensive action elsewhere, or be required to establish a delaying position in order to delay the enemy forward of a specific area for a specified period.

53. Withdrawal

Cover and concealment provided by the jungle facilitate withdrawal by units in contact with the enemy. Small groups familiar with the route over which they are to move can deny these trails to the enemy and force him to attack on a narrow front or make him cut trails around the delaying group. This delays the enemy long enough to allow the main body to withdraw. Withdrawal by daylight in jungle areas has many advantages of a night withdrawal in more open terrain, and it permits a greater degree of control. However, since personnel and equipment moving along wide trails easily observed from the air offer favorable targets to hostile aircraft, maximum use of ambushes should be made.

54. Delaying Defense

a. In dense jungle areas, delaying action is executed principally on and near trails. In open areas, the action frequently requires the occupation and defense of one or more delaying positions. The

flanks of such delaying positions must be protected against envelopment by the enemy.

b. Small, well trained units can delay forces many times their size, however, since this type of cambat is especially strenuous, units should be divided into groups which may alternate in occupying delaying positions and thus obtain rest, while the enemy is kept constantly engaged. Forward observers remain with the delaying force.

c. In addition to their normal equipment, delaying groups should carry axes, mines, and explosives. In order to cause the maximum delay, particularly of vehicles, bridges should be destroyed and trees and other obstacles placed across all trails and roads as far forward from the delaying positions as time and the situation permit. Mines should be placed in the jungle on both sides of the obstacles, and in the obstacles themselves to make their removal hazardous. At points where the jungle is thin and does not offer an obstacle to the movement of foot troops, mines may be employed to deny these avenues of approach to the enemy. Mines placed along trails and paths will cause the enemy to move with caution and delay his progress. Obstacles should be placed along the front of delaying positions in such a manner that the enemy movement will be canalized into areas where the delaying force can place the most fire power.

d. Because of the difficulties of supply and coordination, small forces are better suited for executing delaying action in the jungle. Reserves

should be available behind leading elements along each trail to support these elements and to patrol trails to prevent them from being cut off.

55. Employment of Chemicals in Retrograde Movements

a. Persistent Effect Agents. Chemical mines can assist in the withdrawal or delay by supplementing other barriers, obstacles, and demolitions. Specific areas recommended for the use of chemical mines are demolition sites of bridges, approaches, and fordable crossing sites. The chemical mining of key trails, junction sites, or possible ambush areas will increase the number of enemy casualties. The commander can also use persistent effect toxic chemical agents to canalize the enemy into preselected areas or routes where other weapons can be used more effectively to cover the retrograde movement.

b. Nonpersistent Effect Agents.

(1) *Vapor concentrations.* Nonpersistent effect toxic chemical agents can be used to disrupt the enemy's attack formations by causing quick casualties and forcing him to slow down or break contact with the friendly retrograde maneuver.

(2) *Liquid concentrations.* The agents can be used for their liquid effect to create casualties by absorption through the clothing and skin. No known permeable combat clothing will give adequate protection against liquid nerve gas.

c. Increased Communications Difficulties for Enemy Forces. Communication and control in the jungle will be difficult. By forcing the enemy to mask because of the presence of toxic chemical agents, commanders can increase this difficulty and decrease the enemy's ability to maintain contact with the friendly retrograde operation.

d. Troop Safety No Restriction. Troop safety on the part of employing commanders will not be a major concern in the use of either persistent effect or nonpersistent effect toxic chemical agents in support of retrograde operations. Friendly forces will be moving away from the contamination. This plus the existence of reduced wind speeds (drag effect) and heavy foliage in jungle areas, add to the effectiveness of toxic chemical agents in jungle retrograde movements. Detailed discussions of agent characteristics and employment are found in FM's 3–5 and 20–32 and TM's 3–200 and 3–300.

CHAPTER 4
SPECIAL OPERATIONS

56. General

a. Military operations in the jungle include many types of special operations. The rugged terrain, weather and visibility complicate the problem of control, movement, and supply to the degree that specialized operations must be employed.

b. The jungle offers concealment and limits visibility to the extent surprise in both the attack and the defense may be exploited to an unusual degree. Formations are compact and similar to those used in night operations in open or lightly wooded terrain. Small units are assigned individual missions to an unusual degree. The personnel of such small units must be in the best possible physical condition and highly trained for their specialized missions. The development of initiative, boldness, and determination in the small unit commander and the development of self-reliance and reliability on the part of the individual soldier are major training objectives. Jungle operations require the highest development of leadership among all commanders.

57. Raids

a. For the general principles on raids and a detailed discussion concerning raids, see chapter 13, FM 21–75.

b. Jungle terrain lends itself readily to raid type operations due to the many well concealed routes available. The limited visibility and excellent concealment enable skilled raiding patrols to penetrate deep into territory controlled by the enemy. A platoon or smaller unit is best suited to raid type operations in the jungle. Supporting fires may be used, if available, but the problems of fire control, the timing of operations and communications, make the employment of fire support very difficult.

c. The execution of a raid that will require a deep penetration into the jungle will be affected by the physical endurance required of the men to traverse the jungle terrain, the lack of detailed information of the enemy position, resupply, and evacuation. This can be minimized by establishing a patrol base in the general area of the final objective. From there, reconnaissance patrols can be dispatched to scout the enemy positions. Meanwhile, other members of the raiding force can be allowed to rest and prepare for the forthcoming action. (See par. 60 for definition of patrol base.)

d. Whenever possible and practicable, Army aircraft should be utilized to transport raiding patrol members into or near the general area of the objective. This will enable the raiding patrol to reach their objective faster and in better physical condition to accomplish their mission. The limiting factors in the use of Army aircraft are landing areas, load capacity, and the possible loss of the element of surprise due to the noise of the aircraft.

58. Ambush

a. For the general principles on ambush patrols, and a detailed discussion concerning ambushes, see chapter 13, FM 21–75.

b. The excellent concealment provided by the thick wall of secondary growth generally found along the sides of roads and trails, particularly favors this type of combat. Because of this, ambushes are frequently employed in jungle operations. All personnel should be thoroughly trained in ambush and counter-ambush techniques. Selection of positions, occupation and organization of positions, execution of the ambush, and the conduct of a planned withdrawal should be emphasized.

c. Jungle terrain presents the same advantages and disadvantages to the enemy as it does the friendly forces. Consequently, the enemy can be expected to frequently attempt to ambush our forces. For this reason, each unit must establish a counterambush plan before moving through the jungle and the security measures to employ to detect and avoid an ambush. The counterambush plan must prescribe the specific actions that each individual and unit must take if and when an ambush is encountered.

59. Counter Ambush

A unit caught in an ambush is at a distinct disadvantage and the entire column must react without hesitation or the casualty rate will be devastating. Two techniques can be employed against an ambush.

a. The element under fire, must react immediately by returning a maximum volume of fire. Individuals simultaneously seek cover quickly and build up fire superiority. Elements not involved in the ambush and/or individuals who have moved out of the enemy's fire must maneuver against the enemy position without further orders because their leaders may have become casualties.

b. The second technique that can be employed, requires extensive training to achieve the desired results. Individuals must be conditioned mentally to realize the validity of the technique to be employed. This technique requires the individual or unit to simultaneously return fire and assault the ambush position. This reaction causes the enemy to become confused, astonished, and panicky of the supposedly mad and reckless reaction; thereby, aiding the unit to achieve success rapidly with less casualties, as ironic as it may seem. This action will prevent the enemy's reorganization or withdrawal.

60. Patrol Base

The patrol base operation is a specialized type of operation which is used in jungle warfare and in other difficult terrain. In jungle warfare, continuous lines of major forces facing each other are rare. Units combating each other may well be separated by considerable distance, due to their reliance on limited bases and few supply routes. The patrol base is used as an information gathering agency only when the units are separated by a relatively great distance and when no other

agency can obtain the required information. The patrol base operation is carefully planned and the problems of supply, resupply, and communication are given special attention. The unit which is to establish the patrol base must be large enough to provide protection during the advance to the patrol base site and to defend the patrol base while the patrol missions are being accomplished. The patrol base is established near enough to the enemy force so that small patrols may gather information. The patrol base operation represents an economy of force because it is capable of maintaining a large number of small patrols at a relatively great distance from the main body of friendly troops. Without the patrol base, patrols would have to be larger and would be very susceptible to ambush while accomplishing their missions. Within the patrol base, information gathered can be evaluated by qualified specialists and the resulting intelligence transmitted to higher headquarters over any available means of communication.

61. Night Operations

a. Navigation and Control. Effective movement and control at night is predicated on prior reconnaissance, stealth and silence in moving, close physical contact between individuals, and maximum use of navigational aids (compass, luminous disks and jungle matter, white material attached to equipment, use of engineer tape and/or telephone wire). In a tactical movement, a commander must insure slow movement, close formation, fre-

quent halts to check formation and number of men, and use of pacing and the compass. Normally, a single-file column formation is used to facilitate tactical control and insure maintenance of direction.

b. The Attack. In the attack, patrols may lay engineer tape or visually mark the attack route prior to a company moving out. This route designation may lead into the area selected for tactical deployment of units prior to the assault. In any event, the probable point or line of deployment is indicated by prepositioned individuals from the patrol or by other means of identifying the area. At the place of deployment, the attacking units, based on the plan, deploy for the assault. Unless otherwise detected, the assaulting units move quickly and quietly into the enemy position. If detected, units assault as in daytime operations with fire and close combat. Often terrain restrictions will limit the proper employment of the assaulting force. In this event, the plan requires fire discipline and, in some cases, no firing at all, as described earlier.

CHAPTER 5

EMPLOYMENT OF SUPPORTING ARMS AND SERVICES

Section I. INFANTRY

62. General

a. To obtain the full value of concentrated firepower from supporting weapons, commanders must determine how and to what extent they can overcome the limitations imposed by the jungle on the mobility, visibility, and control of the infantry's organic supporting weapons. Not only is it difficult to solve these problems; in addition, good firing positions for direct fire and indirect fire weapons are comparatively hard to find in dense jungle terrain.

b. In jungle fighting, it is not advisable to assume that every sound or movement to the front is made by the enemy. It could be a small friendly unit that has strayed from its assigned zone to the adjacent unit's line of fire. All units must include in their standing operating procedure the circumstances under which individual and crew-served weapons will fire on targets that are not definitely identified. The SOP should establish methods of maintaining lateral contact and must prescribe specific procedures for obtaining the current location of adjacent units.

c. The enemy will invite fire on small probing units in an effort to locate weapon positions. Therefore, the commander must insure fire discipline at night within the perimeter and prescribe the conditions under which each type weapon will open fire. These conditions must be understood and adhered to by weapon crews and the leaders of supported units.

63. Mortars

a. Emphasis must be placed on the employment of mortars in the jungle. Commanders must anticipate displacements well in advance and plan to prepare positions as far in advance as possible. The time factor for the preparation of emplacement, entry roads and mask clearance is greatly increased; requiring as much as 4 to 24 hours.

b. The selection of good firing positions is difficult. Positions will be compact and must be cut out of the jungle. Advance parties must be increased and supplied additional axes, machetes and other engineer tools.

c. In preparing mortar emplacements outlined in FM 6–50, the following modification must be made.

(1) Dirt must be placed between the layers of logs to decrease bouncing.

(2) Base plates must be pegged at the rear to prevent sliding.

d. Cutting of mask clearance must be kept to a minimum. Small trees should be bent and an-

chored to preclude the complete loss of overhead canopy. Branches of fallen trees must be used as camouflage to replace the cut canopy, and fresh cut stumps must be blackened.

e. The thick undergrowth forces the survey team to tape short legs which results in less accuracy.

f. Personnel of the 81mm mortar must be physically conditioned to displace without vehicular transportation. Unit SOP's must charge subordinate elements with the responsibility of hand carrying ammunition for the mortars to predesignated points.

g. The limitation imposed on observation and visibility requires an increased number of observers and all leaders must have a working knowledge of observed fire procedures and means of communicating fire requests.

h. Observers must operate well forward and receive extensive training to adjust fire by sound sensing using the creeping method of adjustment. Observed fire on the ground will be extremely difficult or impractical due to the vegetation which limits observation and visibility to short distances.

64. 106mm Recoilless Rifle

The employment of the 106mm recoilless rifle will be restricted to the road. When employed, it is assigned its primary mission of antitank protection with a secondary mission of providing fire support.

65. Machine Guns

The jungle terrain does not materially alter the employment of the machine guns of the rifle platoon's weapon squad. They should remain with the platoon.

66. 3.5-Inch Rocket Launcher

The accuracy, mobility, and striking power of the 3.5 rocket launchers of the rifle platoon's weapons squad, make them invaluable as supporting weapons for jungle operation. They are exceptionally useful in reducing pillboxes and bunkers frequently encountered in jungle operations. Care must be taken to select positions that afford safety from, and disclosure of, the positions by the backblast.

67. Mines and Booby Traps

The jungle lends itself to the use of mines and booby traps. The characteristics of the jungle cause their emplacement to be comparatively easy; and detection extremely difficult. Mines and booby traps can be used to an advantage along trails, roads, ridge lines, streams, and in conjunction with other defensive measures. Recording and reporting is extremely important and is accomplished as outlined in appropriate publications. See FM 5–32.

Section II. ARTILLERY

68. General

a. Artillery Principles. The principles of artillery employment in jungle operations conform

closely to the tactical and technical principles covered by FM 6–20.

b. Limitations. The use of artillery is limited by the typical jungle characteristics; poor ground observation, lack of roads and open areas for gun positions, logistical difficulties, and climatic conditions.

c. Coordination With the Infantry. (See FM 6–2*c.*)

d. Positions.

(1) Battery positions usually have to be carved out of the jungle and are small and compact. Logs from cleared areas should be saved to construct gun emplacements and personnel shelters. The swampy condition of the terrain may often make it impossible to dig adequate gun emplacements and slit trenches.

(2) Since the jungle affords excellent concealment for enemy offensive operations all artillery positions must provide ample security against enemy infiltration. To insure protection for the positions, security measures include warning devices, all around security, and patrols to make liaison with other rear installations. To facilitate security, fire support and logistical installation may be grouped in general proximity to each other.

(3) In coastal areas, suitable positions may often be found on the beaches, around plantations, or on nearby islands.

69. Observation

a. Forward observer teams are seriously handicapped by restricted visibility, and suitable observation posts are difficult to find.

(1) Forward observers must remain constantly with the supported unit even if it means leaving high ground when the supported unit advances.

(2) Forward observers should, where the jungle terrain permits, cooperate with the aerial observer for the utmost effectiveness in verifying the location of troops and in obtaining positive sensing of initial rounds and completion of the fire mission.

(3) In making adjustments, forward observers should be proficient in sound sensing, since observation and visibility will be limited to a few yards.

b. Air observation is restricted over jungle terrain, but may be used to good advantage to—

(1) Observe for enemy activities such as movement over water or cleared areas on land.

(2) Give the general location of enemy installations.

(3) Locate enemy artillery positions.

(4) Observe and adjust artillery fires.

70. Offense and Defense

See FM 6–20 for the principles of the employment of artillery in the offense and defense. (Dis-

placements may be very difficult, due to lack of roads and suitable position areas.)

71. Targets

Targets are hard to find. After locating suspected targets, although requiring the expenditure of large quantities of ammunition, it may be necessary first to blast away jungle undergrowth by means of air bursts and tree bursts before maximum effect on the target can be obtained.

72. Ammunition

a. Special care must be taken to protect ammunition from dampness and deterioration in tropical jungle climate.

b. The selection of types of ammunition and fuzes for jungle targets is the same as for similar targets in normal locations except that—

(1) Time fuze adjustment is difficult, even in open areas, because of the high grass.

(2) The burst from a proximity (VT) fuze is difficult to sense in adjustment when the trees form an overhead canopy. The performance of this fuze is apt to be erratic, due to the excessive moisture in the air and on the ground.

(3) The delay fuze is valuable for obtaining bursts near ground level when foliage is high and thick.

(4) Smoke or WP is valuable for use in adjustment, if observation is not limited.

(5) Base ejection smoke may be used for close air support marking.

73. Communications

a. Wire is the most reliable means of communication for controlling artillery in jungle operations. However, it is difficult to install and maintain. Light wire can be laid on top of foliage by liaison planes or helicopter.

b. The range of radios is shortened by jungle growth, but this problem may be resolved by using radio relay stations, both air and ground.

74. Fire Control

Fire control is centralized whenever possible; however, decentralization of control will be necessary as the density of the jungle increases.

Section III. AIR DEFENSE ARTILLERY AND NAVAL GUNFIRE

75. Employment of ADA

a. General. The basic tactics and techniques involved in the employment of Air Defense Artillery will not change greatly in jungle operations, see FM 44–1 and FM 100–5. Extensive detailed planning is required in advance of an operation to determine the amount, type, and most effective employment of ADA. Air defense must be provided for ports, beachheads, and advanced bases which are the starting points for offensive jungle operations. As the operation progresses air defense must be planned and provided for installations, troop concentrations, and other activities in open areas subject to aerial observation and at-

tack. ADA defenses fall into two general categories—

(1) *Installations subject to ground attack.* In the early phases of an operation ADA deployment is limited by a defendable perimeter. ADA must remain within the main perimeter or be provided with a strong local defense. ADA should be emplaced to fire on surface targets as well as aerial targets.

(2) *Installations relatively secure from ground attack.* These conditions are encountered in defending existing installations in friendly territory or the expansion of defenses in captured territory well behind the combat zone. The preparation and occupation of such defensive positions is relatively deliberate. Position areas should be selected to maximize the capabilities and minimize the limitations of equipment employed. Roads may not be present and sites may require extensive preparation at the time positive areas are selected. Roads and sites should be completed before occupation. Local security must be provided but is not a primary factor in this type of defense.

b. Medium and Heavy ADA. Normally there will be a requirement for medium and heavy ADA at ports, beachheads, and other areas used as the forward base for jungle operations. Since medium

and heavy ADA is dependent on radar for fire control, their siting is much more critical than light ADA. The size and weight of equipment present serious problems in movement through jungle. Until such time as medium and heavy ADA defenses can be installed tactical aircraft must be depended on to defend forward installations from high level aerial attack. Medium and heavy ADA sites should be selected to optimize fire control system coverages for air defense. In the defense of shore installations weapons can frequently be sited to fire on waterborne targets in addition to their air defense role. Construction equipment must be available, not only to prepare roads and sites prior to occupation, but to maintain, improve, and expand the defense. Requirements for construction equipment and personnel are much greater in jungle than other type operations.

c. Light ADA. Light ADA is more mobile and has fewer technical limitations than medium or heavy ADA. It will therefore be employed more extensively than medium and heavy ADA in the early phases of an operation. There will be fewer areas requiring light ADA protection. Concentrations of material and personnel are greatly restricted in jungle areas. Jungle areas provide better means of passive defense. The overall requirement for light ADA will depend on the individual operation. Although the number of defended areas will normally decrease in jungle operations, those subject to attack will become

increasingly vital and may justify a higher level of defense than similar installations in another type operation.

d. Critical Aspects. The most critical aspects of employment of ADA are the need for reconnaissance in considerable detail, the requirements for extensive clearing of fields of fire, and the inaccessibility of optimum positions. This may prevent the attainment of the optimum level of defense desired by limiting the number of weapons that may be employed in a defense area. Further, terrain considerations may require decentralization of control.

76. Employment of Naval Gunfire

The principles of employment of naval gunfire are the same as for normal operations, with the exception that observation will be limited. At times, observation may be possible only from the air.

Section IV. TANK UNIT EMPLOYMENT

77. Mission

The mission of tank units in the jungle is the destruction of the enemy by using firepower, maneuver, and shock action.

78. Tactical Employment

a. Jungle operations prescribe small tank units, close coordination with other arms, and extensive and detailed planning. Generally, the tank com-

pany or platoon is the largest tank unit employed in the jungle, but occasionally tank units of battalion size may be feasible.

b. Just as the extremes of terrain found in the jungle affect the size of the tank unit employed, so does it proportionately increase the amount of coordination necessary between combat arms. Each tank needs dismounted infantry to give it close-in protection from tank-killer teams and dismounted enemy. Engineers are essential for road construction, for stream and river bridging, and for many other engineer tasks which tanks may require to retain mobility. When tanks are separated from the dismounted infantry, fixed and variable time artillery fires over the tanks in the assault give them close-in protection. In all phases of jungle combat, the tank is an integral part of the combined arms team of infantry, engineers, and artillery.

c. In dense jungle where tanks cannot operate closely with the infantry, tanks are kept in reserve to provide fire support as possible. Although tanks have the capability of providing indirect fire support, this measure is seldom used in inland jungle operations. However, indirect firing instruments provide the tank crew a night firing capability and an emergency means of providing indirect fire in the event no appropriate artillery weapon is available. Tanks find their best utilization forward with rifle companies and platoon to give close-in fire support, shock action, and psychological value to the infantry.

d. For a more detailed discussion of the tactics and techniques used by tank units, see FM 17–33.

79. Effect of Extreme Heat

Tanks are designed to operate efficiently at temperatures up to 160° Fahrenheit. The tank crew, however, is adversely affected by the heat and humidity. The crew is easily fatigued, and more than the usual amount of time must be allowed for tank maintenance and resupply.

Section V. ENGINEERS

80. Road Construction

a. The speed with which jungle operations are conducted is affected more by engineer effort than in normal operations. In temperate zones, the progress of the infantry usually depends upon how fast their units can overcome enemy resistance, and the ability of the engineers to keep up with the most rapid advance. In nearly all jungle areas, roads are relatively undeveloped or nonexistent. They are usually narrow and winding, incapable of supporting sustained military traffic. Therefore, the bulk of engineer effort centers around the construction and maintenance of roads and trails.

b. There are numerous factors that complicate road construction in the jungle. The heavy rainfall in these areas imposes a drainage problem of major concern. Whenever possible, low ground should be avoided in laying out a road. When it is

impossible to bypass low, swampy ground, it will be necessary to construct long sections of corduroy road. It is advisable to cut the right of way much wider than normal so the sun can dry out the road bed. The enlarged right of way also provides room for the construction of the ditches necessary to keep the subgrade drained.

c. The engineers need heavy construction equipment, and additional bulldozers and other construction equipment must be procured for supporting engineer units or installations. If the road net will permit, an alternate route plan is set up so that main roads or sections of them may be closed when they need major repairs.

81. River Crossing

a. In large scale jungle operations, when time and equipment are available, the standard river crossing procedures, bridging, and stream crossing expedients described in FM 31–60, are applicable. In small scale operations, or as field expedients, the rope suspension bridges and the suspension cable way, described in FM 31–72 and TM 5–279, have been found to be useful.

b. The jungle provides excellent concealment for river crossing operations in most instances. Troops and hand-carried material can be brought up to almost any desired site without additional road construction. However, when selecting the site, the climatic conditions of the area pertaining to the annual rainfall and flooding conditions must be carefully analyzed. Flash floods are char-

acteristic of most jungle areas, even in the dry season. If heavy equipment is to be used, the road construction required and soil trafficability must be considered.

82. Water Supply

Water sources are usually abundant, but special treatment is required due to the presence of resistant organisms. See paragraph 118 for health hazards and methods of engineer and individual water treatment.

83. Mine Warfare

Since the jungle itself is an effective obstacle against vehicles, antitank mines and other antivehicle obstacles are normally confined to roads, trails, and occasional patches of cleared ground. Antipersonnel mines are usually incorporated into defensive plans to delay and divert the enemy and to serve as warning devices.

84. Mapping

Because of the inaccessibility of jungle areas, adequate maps are scarce and those that are available are frequently inaccurate except for the location of coastlines and principal rivers. The numerous unnamed swamps, streams, inlets, and lagoons are seldom indicated, and contours, if shown, are seldom accurate. The trail nets shown can seldom be depended on, because trails are rapidly reclaimed by the jungle. Native towns and villages frequently bear native names entirely different from those on the maps. This is also true of many

terrain features. Any information that can be used to correct existing maps should be forwarded to the appropriate headquarters for prompt dissemination. Engineer reconnaissance to supplement the data on maps is of prime importance. The engineers should obtain information on the following topics:

a. Location and condition of roads and trails.

b. Location of road construction and building materials.

c. High water level of streams.

d. Condition of banks at river crossing sites.

e. Location of water sources for drinking, laundering, and bathing.

85. Planning

In planning for a jungle operation, the unusual demand for heavy construction equipment must be considered. The engineers determine what additional equipment is available from special lists and how it may be procured. The jungle provides an abundant supply of timber and it is often desirable to establish a sawmill to provide lumber. Provisions should also be made for treatment of piling and other bridge material to retard decay and withstand the ravage of termites. Sand bags disintegrate rapidly in the jungle, and when they are used, a supply must be available for replacements.

86. Nuclear Weapons

The obstacles resulting from effects of nuclear weapons in jungle terrain generally will be easier

to bypass than overcome. In a tactical situation, the time and engineer effort required to cross nuclear blowdown areas will be excessive. Alternate route of movement must be planned for and prepared as soon as possible to provide means for continuing movement despite nuclear attack.

Section VI. CLOSE AIR SUPPORT

87. Doctrine

The doctrine for the employment of air forces in open areas is equally applicable in the jungle.

88. Target Identification

Close air support targets located between the bomb line and friendly positions must be accurately identified to the striking aircraft before the attack. Either a target director post or an air control team furnishes the target identification and controls the air strikes. A forward air controller may identify a target for aircraft through any one or a combination of the means indicated below.

a. Reference to grids or coordinates or large scale maps or mosaics.

b. Reference to nearby landmarks or terrain features readily discernible by the aircraft pilot.

c. Artillery smoke shells, including base ejection smoke shells.

d. Artillery illuminating shells to designate target areas at night.

e. Radio homing and beacon equipment.

f. Adjustment of simulated air attacks to definitely orient a pilot.

g. Use of any one or a combination of the foregoing methods to orient a tactical air coordinator who, in turn, leads attacking aircraft to the target. The tactical air coordinator should have a means of marking the target.

h. Colored smoke rifle grenades or white phosphorous mortar shells.

89. Control

a. When the forward air controller cannot observe well enough to control air strikes, the tactical air coordinator may assume this job. The tactical air coordinator can increase the effectiveness of close support operations by locating targets before the combat aircraft arrive in the objective area. When suitable multiplace reconnaissance aircraft is available, it is desirable to have the ground commander or his representative accompany the air coordinator to advise on ground force preferences.

b. Location of friendly front lines is of vital importance in close air support operations. This can and must be accomplished through use of panels, colored smoke, or indentifiable terrain features apparent to the pilot.

Section VII. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE (CBR)

90. General

The doctrine and principles for employing CBR

agents, and the methods of protection from enemy use of these agents in jungle terrain are the same as in other terrain. Detailed discussions of offensive and defensive CBR warfare are to be found in FM 3–5 and FM 21–40. The techniques of employment and defense that are peculiar to jungle warfare are discussed in chapter 6, FM 3–5.

91. Toxic Chemical Agents

a. Toxic chemical agents disseminated for persistent effect, such as mustard gas (HD) for liquid contamination, are extremely effective in a jungle when used against troops unless they are wearing complete protective equipment. High temperatures and low winds help to create high vapor concentrations of such type agents. Extensive foliage tends to break up liquid concentrations, although drops and splashes of liquid agent on foliage near the ground present a long term hazard to personnel in the area.

b. Toxic chemical agents disseminated for nonpersistent effect are effective in the jungle and remain effective (persist) for long periods of time. The G-agents have excellent characteristics for use in the jungle since they tend to be relatively persistent, are highly toxic, and are not affected by the high humidity or absorbed by jungle vegetation. Phosgene (CG) is rapidly absorbed by the lush vegetation. Cyanogen chloride (CK), although less toxic than CG, is not absorbed by vegetation and has been known to persist in casualty producing concentrations for as long as

4 hours in jungle forests. Concentrations obtained in the jungle may be three times higher than those in the open.

c. Toxic chemical agents can be used effectively in mining and in boobytrapping jungle trails used by the enemy or leading into our own defensive positions; in bombing or shelling assembly areas, bivouac areas, and enemy installations; and in defensive fires. When toxic chemical agents are used in support of the defensive or offensive action, the protective measures available to friendly troops must be considered since even nonpersistent effect agents will persist for longer periods in the target area and its vicinity. Toxic chemical agents can be used in the jungle to neutralize or contaminate islands or pockets of enemy resistance which may then be bypassed. Nonpersistent effect agents are particularly effective against enemy bunkers, cave positions and similar strong points.

d. Artillery shells and aerial bombs with delay fuzes are the best means of delivering toxic chemical agents in the jungle. Artillery and mortar fire bursting more than forty feet in the air result in the complete loss of the agent; the average loss of agent when delay fuzes are not used will be about 25 percent. Aerial spray is only about 10 percent effective, due to the jungle canopy. Toxic chemical landmines should be protected from rust; fuzes and detonators must be protected from moisture and mildew. Care must be taken that trip wires are not fouled by rapid growth of jungle foliage.

Munition requirements for persistent and nonpersistent effect in the jungle are found in FM 3–5.

92. Smoke and Flame Weapons

a. Smoke may be used for signaling, for marking targets, and for providing smokescreens, curtains, and blinding smoke on enemy installations. Colored smoke grenades, shells, and smoke streamer rifle grenades are useful for signaling or marking purposes. Limitations on visibility in the jungle will govern their use. For example, smoke streamer rifle grenades projected above the jungle canopy may not be visible to ground troops, but they can be useful signals to air observers and to specially located ground observers.

b. Smokescreens and curtains produced by mechanical generators, smoke pots, shells, or aerial bombs may be used to limit air and ground observation when the vegetation and tree top canopy are not dense enough to give concealment. Smoke sprayed from airplane smoke tanks will generally be ineffective in jungle operations because of turbulent air currents above the jungle canopy which rapidly disperse the smoke. Smoke curtains produced by artillery and mortar shells can be employed effectively by ground troops in the attack. Individual bunkers and isolated strong points can be blinded by the use of HC and White Phosphorous (WP) grenades prior to assault. HC and WP may have an incendiary effect, so fire hazards should be considered before using them. White phosphorous also has a casualty and demoralizing effect which may be desirable. Munitions require-

ments for ground and air smoke munitions are found in FM 3–5.

c. Flame weapons are used effectively in the jungle to cause casualties and to destroy the natural concealment and camouflage afforded by the vegetation. Flame throwers, artillery, mortars, rockets, and fire bombs delivered by tactical air are all effective methods of employing flame weapons, including incendiaries, in this type of terrain. Flame landmines, prepared locally from empty fuel drums or other containers filled with thickened fuel, can be used defensively against infiltrating or attacking enemy forces for warning effects, casualty effect, and for battle field illumination.

93. Biological Agents

Biological agents can be used effectively in the jungle against man, animal, and crops to cause death and disease without the destructive effects of Nuclear or HE weapons. These agents include living organisms, their toxic products, and certain chemicals which have a detrimental effect on plant life.

a. Antipersonnel/Antianimal Agents. Natural junge conditions such as high humidity, temperature, and the protection from the sun afforded by the jungle, are conducive to the growth and life of biological organisms. BW agents released below the jungle canopy would persist for some time, although area coverage of munitions would be reduced because of the low wind speeds generally present in the jungle. Munitions would require

release closer to the target than normally to be fully effective. BW munitions releasing agents above the jungle canopy will be reduced in effectiveness. Animal and insect carriers, such as rats, mosquitos, fleas, and ticks exist in quantity and multiply rapidly in the jungle areas. Strict control measures are required to minimize these possible methods of BW agent dissemination. Although some BW agents are delayed in action, proper planning in which time will permit casualties to develop may allow their use on troops and animals. Isolated strongholds, fortified islands, weapon areas, command posts, observation posts, personnel in fortifications with overhead cover, and other semistatic installations are among the possible targets of tactical BW attack.

b. Anticrop Agents. There are a number of possible BW agents which are effective in the jungle against plants, shrubs, and trees and against the food and industrial crops produced by them. Plant diseases include those of basic food crops such as rice, grasses, cereals, and vegetables. Tactical operations destroying food supplies in an area will require planning for subsistence aid for inhabitants and for protection of troop supplies. The anticrop agents also include chemical anticrop regulators and defoliants which can be used in jungle operations. The plant growth regulators can be used to control weed, crop, and plant growth. Defoliants can be used to control vegetation and to denude trees; thus exposing ground operations, installations, material, and personnel

to observation; to mark targets, positions, and guidelines and to clear and keep open fields of fire around defensive positions. Destruction of the natural vegetation can also be used to reveal camouflage activities. Such agents disseminated by aircraft spray require from 1 to 10 days to be fully effective. Tactical operational planning must allow for this delay factor. Desiccant type chemical agents, such as DANC and bleach slurry, applied to the vegetation and then burned after agent has dried can be used to expose a limited area, such as a suspected minefield. Portable or mechanized flame throwers or airspray or fire bomb munitions can be used to apply the desiccant and gasoline/oil/napalm mixtures.

c. Other Publications. For detailed technical details and possible BW agents, see TM 3–215. Tactical considerations are contained in FM 3–5.

94. Nuclear Weapons Effects

Thermal effects from range of both the blast and heat effects from a nuclear explosion will be considerably reduced by the dense vegetation. The blast effect may be distorted by the dense vegetation but will create considerable missiles, and obstacles. Trees blown down may reduce fields of fire. Fires may be started in dry brush and flammable supplies through heat effects of detonation. Jungle terrain will not significantly alter the initial nuclear radiation effect. The effect of radiological agents and radioactive fallout may be significantly reduced by extremely heavy vegetation. This fallout may later be washed by rain

to the surface of the ground. Actions required of individuals and units in radiologically contaminated areas are contained in FM 21–40, FM 21–41, and DA Pam 39–1, and other publications on nuclear warfare.

95. Defense Against CBR Attack

a. The means and methods of protection against CBR attack outlined in FM 21–40 and FM 21–41 are effective in the jungle operations.

b. The protective mask and permeable protective clothing are tolerable in jungle terrain and climate. Limitations on vision imposed by the mask combined with personal discomfort as a result of wearing the protective equipment may decrease individual efficiency and even present a morale problem. Prior individual and unit training in CBR protective measures carried out in jungle terrain is particularly important in order to overcome or allow for these problems. Such training can be most effectively given by integrating it into the individual and unit phases of jungle warfare training.

c. Special precautions must be observed to maintain unit defensive equipment in usable condition because of the greater mildew rot, and rust threats existing in jungle areas.

Section VIII. ARMY AVIATION

96. General

For detailed discussion of Army aviation, see FM 1–5, FM 1–100, and FM 57–35.

97. Missions

a. The mission of Army aviation is to expedite and facilitate the conduct of all Army operations. Specifically, Army aviation units are equipped and trained to provide the commander with a significantly greater capability for—

(1) Mobility and maneuverability.

(2) Command control and communications.

(3) Observation, reconnaissance, and target acquisition.

b. Army aircraft can be employed in jungle operations for troop movements, resupply, evacuation, wire laying, and other transportation and communication missions.

CHAPTER 6
COMMUNICATION

98. General

a. Standard signal communications systems and techniques will normally be employed in jungle operations. However, lack of trails often restricts or prohibits the use of vehicles and dense foliage may cause excessive attenuation of radio signals from short range sets. Field expedients may have to be improved to cope with these conditions. Lighter, nonorganic equipment which is man-transportable may be used if available. This chapter covers some of the considerations and expedients peculiar to jungle operations.

b. Wire should not be laid prematurely and should be recovered when possible. Batteries deteriorate rapidly in the jungle even when not in use; approximately twice the normal battery requirement may be anticipated. Batteries should not be removed from their waterproof wrapping until time to be used.

c. While all equipment for use in the tropics must be capable of functioning efficiently in a high temperature, temperatures alone do not cause the greatest difficulties. Wetting by salt water, of salt spray in landing operation, and inadequate storage facilities cause much damage. Continuous

damp, warm air causes a general disintegration of most types of insulating material.

d. Fungus growth often reduces the wire insulation resistance to such an extent that service is interrupted. Under tropical conditions, fungus may form in a day or two on the edges of insulators, and in keys and jacks, causing short circuits. Insects also create maintenance problems. Spiders may build webs in switchboard wiring; even lizards have been known to enter equipment and short circuit main bus bars. Termites destroy wooden structures and some types of insulation. Tropical wind storms sometimes carry large quantities of dust which get into equipment and cause contact and insulation trouble.

e. Before beginning jungle operations, every possible measure must be taken to dry out and protect equipment. The care of electronic signal equipment is of special importance in the rainy season. It should be moisture-proofed and fungus-proofed to provide protection against fungus growth, insects, corrosion, and salt spray. The treatment, which is designed for field application, consists of spraying or brushing on a moisture and fungus-resistant varnish. It should be applied prior to arrival where possible and, in every case, prior to issue for use in the jungle. Even after this treatment, additional precautions should be taken. Waterproof covers are an added protection. If covers are not issued, they can be made from salvage material. Signal equipment should never be placed on the ground and left there for long periods.

f. When pack animals carry signal equipment, frequent inspections are made to see that the equipment is traveling securely. When time permits at halts, the equipment and lashings should be examined and tested.

99. Wire

a. The limitations imposed by the jungle on the other means of communication cause a greater dependence upon wire. Ground wire routes are limited and the few available routes will be heavily traveled, making overhead construction imperative in most cases. Helicopters from the Division Aviation Company should be used to lay wire rapidly over the canopy of the jungles. The talking range of wire on long lines may be reduced by moisture. Such circuits should always be designated on the basis of wet wire transmission factors. Expedients to overcome this may include the use of telephone repeaters or use of a twisted pair for each side of the circuit. Increased capability of enemy infiltration makes telephone security particularly important.

b. In a fast-moving situation, it may be difficult to maintain wire communication, but wire teams should follow attacking elements as closely as possible.

c. Wire commnuications in attack and defense will generally follow the procedures set forth in FM 7–24.

100. Radio

a. Although radio communication in the jungle

is highly desirable, particularly in the attack, its normal operating range is seriously reduced by dense vegetation and adverse atmospheric conditions. Radio operators must be trained to copy weak signals and to use every expedient possible in siting and constructing antennas. Remote control of equipment may be helpful in gaining a more favorable location of the radio set. Radio sets may have to be hand transported and hand-operated. Substitution of man-packed sets for vehicular sets may be necessary.

b. Army aircraft can assist greatly in ground communications by acting as radio relay stations and making terrain surveys for radio relay sites. Rotary wing aircraft can be used to transport personnel and equipment to selected sites enabling the installation of important circuits with maximum speed. Aircraft may also be used to supply operating personnel with rations, POL and maintenance parts.

101. Messenger

a. The messenger is one of the most reliable means of communication in jungle operations particularly in lower units. Except when roads are available motor messengers will be of little value. Messengers should be carefully selected men with a high degree of intelligence, courage, and aggressiveness. Their training should include instructions in jungle lore, trail knowledge, map reading, evasion and escape, and the use of the compass. Trails blazed with code markings materially as-

sist messenger communication. In dense and difficult jungle, messengers are employed in pairs. In the battle group, company, and platoon, messenger communication is one of the primary means. In the defense, it supplements wire communication. A number of men should be trained to replace messenger casualties.

b. The use of aircraft from the Division Aviation Company for messenger service is dependent on suitable landing facilities. The helicopter is most desirable for this purpose, since it requires little space for landing and taking off. Aerial drop and pickup techniques may be used with fixed-wing aircraft where the terrain does not afford a suitable landing field.

102. Sound Communication

Sound can be used to great advantage in the jungle, particularly as a prearranged signal for security units and patrols. The sound of liaison plane helicopters or overhead artillery fire may be used by ground personnel to maintain their direction of attack. Jungle drums and hollow logs may be utilized to send messages by transmitting prearranged code.

103. Visual Communication

a. Visual communication includes the transmission of messages by flags, panels, and pyrotechnics, but its use is limited by the density of the jungle. Areas in which panels may be used are scarce.

b. Semaphore flags can be suitably employed in jungle operation. Flags may be obtained from

available stocks, or may be improvised. Flag stations must be located to deny observation by the enemy, and they should have a contrasting background against which the flags will stand out clearly.

c. While it is fundamental that lamp signals are sent only from front to rear, situations will occur in jungle operations in which such communication is permissible in both directions. Lamp stations should be concealed from enemy observation, and will generally be located along straight stretches of trail. Either white, red or infrared beams may be used. In general, the white beam is visible at greater distances by night; the red beam by day. In fog and smoke, the red beam is more satisfactory. A flashlight with an improvised reflector may serve as a signal lamp, or a lantern with an improvised movable cover may be used; the cover is lifted to expose the light for long or short periods to represent dashes and dots.

d. Visual communication by pyrotechnics is not satisfactory in areas of heavy vegetation; it is seldom possible to project them through overhead foliage. If pyrotechnic signals are to be used, individuals should be detailed to look-out for them.

CHAPTER 7
LOGISTICS

Section I. GENERAL

104. Importance and Special Conditions

a. The ability to perform logistical operations and the special conditions affecting logistics in jungle warfare limit the extent of operations, rate of movement, and the strength of the forces employed. The availability of trails, roads, and waterways; the density of natural growth; the season; and general terrain conditions have a direct influence on the types of transportation that can be used and, consequently, on the functioning of supply systems. Supply requirements must be anticipated well in advance of actual needs. Careful planning is necessary to conserve transportation facilities, and the control of all classes of supply must be closely supervised in order to exclude surplus and nonessential items.

b. Unit supply officers must be proficient in advance planning and in forecasting needs: Replenishments must be requisitioned well in advance; reconnaissance of supply routes and water points must be continuous; and alternate routes and distributing points must be located and developed.

c. The jungle affords concealment from air observation and since it is easier to protect convoys

from ambush in the daytime, commanders should move supplies during daylight hours.

d. Special provision must be made to protect supplies from spoilage caused by climatic conditions. Tentage, tarpaulins, or thatched shelters are necessary to provide protection from heavy rains and hot, tropical sunshine. When using tentage or tarpaulins to protect supplies, care must be exercised to insure free circulation of air under the tent or tarpaulins. Supplies, particularly electronic equipment, which are packed in moisture proof packs should not be opened until actually needed for use. Electrical and electronic equipment vulnerable to damage from humidity may be protected by placing it in an improvised "drying" chamber, such as a packing case heated with an electric bulb.

105. Transportation

a. Because of the lack of routes of communication and the difficulties involved in constructing roads and trails, transportation presents a series of problems in jungle operations. Utilization of all modes of transportation should be considered for maximum efficiency.

b. The basic means of jungle transport is handcarry by indigenous help or troops, though pack animals are frequently employed. Jungle vegetation is not satisfactory forage for domesticated animals, so a large part of their load must necessarily be food for them. Native pack animals and handlers may be used to supplement organic means

and to preserve the combat efficiency of troops, but the dependability and maintenance of the natives must be carefully considered.

c. Air transportation is an important factor in the supply of jungle operations. Emergency supplies can be air-lifted to units when all other transportation fails. Army aircraft and helicopters can be employed with success in supplying isolated patrols and small units. When the supply planes cannot land, supplies may be delivered by parachute or free drop. Amphibian planes may be used when suitable water areas are available. When aerial resupply is being employed, the following factors should be considered:

(1) Communication with delivery aircraft.
(2) Clearing and marking of drop or landing zones.
(3) Times of delivery.
(4) Organization of recovery crews.
(5) Preparation of type loads.

d. Waterborne transportation is the most economical and often the surest means of supply. Streams, lagoons, and other waterways should be used to the maximum extent possible. Supplies transported over waterways are less susceptible to loss or damage, fragile containers are safer, and the destruction caused by insects is largely avoided. Boats, canoes, and rafts are the most practicable types of water craft to use. Distribution points should be established along waterways to save transportation by men, animals, and vehicles.

e. Tropical rivers are subject to rapid changes in depth and speed of flow due to rainfall variations. Flooding conditions are often an aid to river transport, because the possibility for using motors is greatly increased. If water transport is a principal means of resupply and evacuation, the wet season will prove to be operationally advantageous. A river may be less than ankle deep in dry season, yet flow at an average depth of more than four feet during wetter periods. On the other hand, sudden flood crests are a danger to cargo-laden craft. This is particularly true during loading and unloading.

f. Wheeled transportation is generally impracticable except on roads (and in the dry seasons on wide trails) and in areas where the jungle growth is light. Engineer and pioneer troops can improve trails to permit movement of ¼-ton trucks and trailers in areas close to the combat echelon. Track laying vehicles are generally reliable in jungle operations and furnish a means of logistic support, however, their use increases maintenance problems. To achieve maximum efficiency in the use of vehicles it may be necessary to establish transfer points for loads; that is, larger vehicles transport supplies as far forward as they can be moved and supplies transloaded to smaller, lighter vehicles which, in turn, will be used to move supplies as far forward as practicable. Pack animals or carrying parties then move the supplies to their destination as required.

106. Classes of Supply

a. Rations used during jungle operations consist primarily of nonperishable canned, dried, or dehydrated items. Packaged rations (C Rations) or small detachment rations (five in one) will normally be issued to units actively engaged in combat. Road and trail limitation will require that the battle group supply and service area can be located back in the rear and carrying parties be used to distribute the rations. The number of rations carried by the individual soldier should be determined by such factors as how and in what quantities food can be brought forward, when resupply will be effected, and the estimated duration of the operation. Hot meals should always be served whenever possible. Feeding is usually done during daylight because of the danger and difficulty of movement at night and the possibility of enemy ambush or night attacks.

b. Rapid deterioration is a primary consideration in class II supply issue, clothing, particularly shoes and socks, last a very short time. For items of this nature, requirements should be estimated well in advance and special provisions should be made for adequate resupply. At unit and battle group levels, limited emergency supplies of assorted shoes, socks, and similar items of short wear periods should be stocked. The troops and the limited transport capable of moving with the troops can carry only a few weapons and small amounts of ammunition. The amounts and types of weapons and ammunition to be carried are com-

mand decisions which must be made after careful consideration of the difficulties of transport and the types of weapons needed to accomplish the mission.

c. The supply of class III items does not initially present a great problem, as relatively few vehicles will be in operation. However, the battle group will establish a class III distributing point for vehicles that are operating. Vehicles will normally be resupplied with gasoline from one or more gasoline tank trucks attached to the battle group from the quartermaster company and located in the supply and service area; 5-gallon gasoline cans will be used to operate the battle group class III distributing point. The resupply system is then based upon the exchange of empty 5-gallon cans for full ones. Vehicle gas tanks are always filled at the rearmost class III distribution point visited.

d. The supply of class IV items will, for the most part, concern special items of individual and unit equipment. In many cases, the equipment normally authorized a unit will be augmented by additional allowance, and special items of clothing and equipment that are needed but not authorized may be obtained. The use of large amounts of special defense equipment in defensive positions is the exception rather than the rule due to difficulties in bringing up such materials.

e. Because of the weight and bulkiness involved, the supply of ammunition and explosives often presents the most difficult resupply problem. The best solution is close control exercised by all

leaders over ammunition expenditures within their units and the employment of the appropriate weapon for the fire mission. Unit, and battle group ammunition distribution points are located behind the front-line units to facilitate supply.

Section II. MEDICAL SERVICE

107. Employment

a. The manner in which medical units support their tactical organizations depend on the employment of the supported unit. Wide variations may be expected at division level and below, but above division, medical support is normal. The greatest variances will be found in the support of the division battle group by the medical platoon, and with the support of the infantry division by its medical battalion.

b. The medical platoon requires considerable augmentation when undertaking jungle operations. This is due to the extreme moist heat, location of tactical units supported, difficulty of traversing terrain with casualty loads, and a requirement to increase medical personnel attached to the tactical companies supported. This augmentation may best be accomplished by the command requesting additional medical personnel, through channels, from field Army unit designed for this purpose. Plans to utilize native litter bearers, when available, are also established prior to entry into combat. Equipment may require modification to permit maximum efficiency in combat. This may

include establishment of pack equipment for all medical installations, and the replacement of wheeled ambulances with other evacuation means appropriate for use in jungle terrain.

108. Battle Group Medical Platoon

a. Evacuation Section. Vehicles used as front line ambulances may not prove practical on jungle trails, in swamps, and on unimproved muddy roads. Evacuation of casualties by litter is a slow and exhausting task, consequently, the evacuation section requires augmentation. Tracked vehicles, pack animals, rafts, boats, barges, litter bearers, or combination thereof, will be required in the evacuation of casualties to augment organic evacuation means. Natives properly supervised by trained medical personnel may be used as litter bearers.

b. Treatment Section. Difficult terrain and wide dispersal of combat elements may dictate the need for further splitting of the aid stations and impose a requirement for additional aid station personnel. Additional support may be required by the front line combat units as in many instances two aid men will be required to support each platoon in the rifle company. Company aid posts may also be required. A minimum of one senior medical aid man is required to operate a company aid post.

109. Medical Platoon Headquarters

Perhaps the greatest problem of the medical platoon headquarters is that of resupply. The medical system of property exchange must be closely

supervised to prevent the stock of medical items from falling to a dangerously low level.

110. Division Medical Battalion

The division medical battalion may be called upon to support the battle group of the division on a division front or on battle group missions. The organization of the medical battalion is such that it will support the battle group and other divisional elements on an area basis. The ambulances of the medical battalion may be replaced by other more maneuverable vehicles. Air evacuation from forward installations may be used to relieve surface transportation of part of its load and, at times, waterways afford a good route of evacuation. The medical helicopter ambulance unit provides an excellent means of evacuation in the jungle. Mobile army surgical hospitals perform immediate surgery in the division area.

111. Personal Hygiene and Sanitation

a. The problem of personnel hygiene is a serious and continuous one in the jungle. A determined and continuing effort by commanders at all levels must be made to provide sanitary facilities for their troops. The mere fact that troops are isolated in jungle areas for long periods of time does not justify letting the hair and beard grow, allowing clothing to become exceptionally dirty, and neglecting body cleanliness. Food handlers in particular must continue the high standards of hygiene which they normally maintain in garrison.

b. Careful and constant practice of military sanitation is imperative. Kitchen and human waste must be disposed of by acceptable methods, or diseases will quickly neutralize the fighting potential of an entire command. See FM 21–10.

112. Diseases in General

a. Troops arriving in jungle areas are exposed to many diseases with which they are not familiar. The level of sanitation in jungle areas and among the native inhabitants is frequently very low. Furthermore, there is often great difficulty in enforcing even the simplest sanitary regulations, as many natives are too ignorant, superstitious, and lazy to cooperate. Water supplies are grossly contaminated and there are no modern water supply systems. Rainwater catchments are used in some areas. Most natives use shallow, poorly protected wells, or drink from streams. There are no sewage systems, and natives are unwilling to use latrines. Animals and some natives dispose of body waste promiscuously, even directly into the streams used for drinking water.

b. The diseases of greatest military concern are malaria, filariasis (elephantiasis), intestinal diseases, venereal diseases, dengue (break-bone) fever, yellow fever, scrub typhus, and typhus fever. Of these, malaria is the most prevalent in all seasons. The common diarrhea and amoebic and bacillary dysentery are the most frequent intestinal diseases, but typhoid and paratyphoid fever also occur. Gonorrhea is the commonest form of venereal disease, but syphilis, chancroid, and

granuloma inguinale are fairly prevalent. Fungus infections are frequent, as are other skin diseases. Tropical ulcers are particularly common. Parasitic infections, heat exhaustion, sunstroke, and pneumonia may affect small numbers of troops.

113. Insect- and Animal-Borne Diseases

Insect- and animal-borne diseases are those which are transmitted from man-to-man or from animal to man by a blood sucking insect or animal. The germ may be introduced into the human bloodstream or tissues during the bite of the infected insect or it may be deposited upon the skin by defecation or during the process of biting. In the latter two instances, scratching the insect bite infects the wound with the germs. The commonest insect and animal disease carriers are listed below, together with suggestions for combating them. Troops must follow the precautionary and preventive measures described in order to avoid infection.

a. Diseases Transmitted By Mosquitoes.

(1) Malaria, yellow fever, dengue (breakbone) fever, filariasis (elephantiasis), and some forms of encephalitis are mosquito-borne. Commanding officers are responsible for executing mosquito-control measures. Their decisions are based on the military situation and the recommendation of the medical service officers who make mosquito surveys. For a detailed discussion of mosquitoes and mosquito control, see FM 21–10 and AR 40–578.

(2) For individual protective measures, use mosquito nets, protective clothing, insect repellent, and insecticide aerosols. At semipermanent camps large tents should be screened and sprayed with a residual insecticide. If malaria is present use suppressive drugs as prescribed by the unit medical officer.

b. Diseases Transmitted By Ticks.

(1) Hard ticks transmit Rocky Mountain spotted fever, other kinds of tickbite fevers (tick typhus), rabbit fever (Tularemia), and tick paralysis.

(2) Soft ticks transmit famine fever (tick-borne relapsing fever).

(3) For individual protection, wear clothing impregnated with repellent, and apply skin repellent to exposed areas. In a tick infested area, personnel should examine their bodies every 3–4 hours and remove any attached ticks. This can be facilitated by using the "buddy-system." At semipermanent camps, brush and vegetation should be removed and appropriate insecticides should be applied as directed by medical service officers.

c. Diseases Transmitted By Sand Flies (Phlebotomus Flies).

(1) Sand-fly fever, 3-day fever (pappataci fever), kalaazar (visceral leishmaniasis) oriental sore, Delhi boil, and tropical sores are sand-fly borne.

(2) For individual protection, use insect repellent, aerosols, protective clothing, and mosquito bar. In semipermanent camps, clear area of rubbish, debris, and ruins. Apply residual insecticide spray to inside of walls and around tent entrances.

d. Diseases Transmitted By Fleas.

(1) The rat flea is a carrier of Black Death (bubonic plague) and murine typhus. The fleas of other rodents may also transmit these diseases.

(2) For individual protection, apply skin repellent to exposed parts of body and impregnate clothing with clothing repellent. In semipermanent camps, apply residual insecticide spray or dust to floor and lower wall of tents, rodent burrows, and around rodent traps.

e. Diseases Transmitted By Body Lice.

(1) The body louse and head louse may transmit jail fever (epidemic typhus fever), and famine fever (relapsing fever).

(2) For individual protection against body lice, apply insecticide powder over inner surface of underclothing and to seams on inside of outer clothing. For head lice apply louse powder freely to the area of head covered by hair.

f. Disease Transmitted By Mites.

(1) Mites are widely distributed throughout the world. In the United States and

Europe, the variety known as chiggers (red bugs) produce considerable skin irritation which may become secondarily infected from scratching. In the Far East, the six-legged larval stage of trombiculid mites transmit "scrub" typhus fever (Japanese river fever or tsutsugamushi fever).

(2) For individual protection, apply skin repellent to exposed parts of the body and impregnate outer clothing and socks with clothing repellent. At semipermanent camps, clear campsites of grass and other vegetation by burning or bulldozing and application of appropriate insecticides as directed by medical service officers.

g. Diseases Transmitted By Bloodsucking Flies.

(1) Deer flies (chrysops) transmit rabbit-fever (tularemia) and the filarial African eyeworm (loa-loa). In Central America black flies and buffalo gnats transmit a filarial worm (Onchocerea volvulus) which causes a troublesome filarial disease. The tsetse fly of Central Africa transmits sleeping sickness (trypanosomiasis).

(2) Mosquito nets, protective clothing, insect repellent, and insecticide aerosols should be used as preventive measures.

h. Diseases Transmitted by Triatomidae (Conenose Bugs, Assassin or Kissing Bugs). Conenose bugs may transmit American Trypanosomiasis (Chagas disease). To avoid these insects, do

not sleep in native huts, native shops, stables, barns, and chicken houses. For individual protection, use mosquito nets and protective clothing. At semipermanent camps or stations, buildings should be screened.

i. Diseases Transmitted by Vampire Bats. Vampire bats and occasionally other types of bats, transmit rabies (hydrophobia) to human beings and animals by their bite. The virus of rabies is carried in the saliva of the infected bat. Immediate first aid treatment consists of washing with soap and water, followed by an antiseptic and a sterile dressing. Antirabic treatment must be administered to persons bitten by any species of bat.

114. Water Borne Diseases (See FM 21–10.)

a. Disease. Typhoid fever, the paratyphoid fevers bacillary dysentery, ambiasis, cholera, and other disease may be transmitted by infected water which is used for drinking and culinary purposes. Schistosomiasis (blood fluke) may readily be encountered in surface water while bathing or swimming, and through drinking. When the fluke is known to be present, water must be avoided. Standard methods of purifying water serve to destroy the larvae of the fluke, but it must be emphasized that at least two parts per million of chlorine must be present after a 30-minute contact period.

b. Preventive Measures.

(1) *Sources.* Water selected for human consumption should be the cleanest avail-

able. Ground water from wells, springs, and infiltration galleries is usually less contaminated, clearer, cooler, and generally more palatable. However, since ground water is limited in quantity, the most common source in the jungles will be surface supplies such as streams, ponds, and lakes. Care must be exercised in selecting the water point to insure that bathing, laundering, and vehicle washing is done downstream.

(2) *Engineer water points.* Whenever possible all drinking water should be procured from engineer water points. Minimum treatment should consist of the following steps: Sedimentation, filtration, and chlorination to assure that the finished water contains not less than two parts per million chlorine residual.

(3) *Emergency and individual water disinfection.*

(*a*) *Lyster bag disinfection.* Only the cleanest water available should be used. Suspended matter may be strained out through cloth or an improvised sand filter. Two ampules of calcium hypochlorite will be dissolved in the 36-gallon lyster bag to assure a minimum of two parts per million of chlorine residual as measured by the orthotoluidine kit after 30 minutes of contact.

(*b*) *Canteen disinfection.* Each man should be provided with an adequate supply of individual water purification tablets (FSN 6850–250–2620) for use on extended patrols or when otherwise isolated from his unit. Generally, adequate disinfection is obtained when one tablet is used for clear water and two tablets for cloudy or turbid water. Other methods, such as boiling and the squad method of chorinating canteens, are discussed in detail in FM 21–10.

(4) *Other water sources.* Water may be obtained during heavy rainfall by catchment from roofs of tents and buildings. This water must then be disinfected before consumption. Sea water can be distilled either in standard engineer equipment or in small quantities with an improvised distillation unit. Such facilities are bulky, extremely heavy, and require large amounts of fuel. Their use is justified only when fresh water is not available.

115. Intestinal Infections

a. Diseases. The principal diseases in this group which occur in the tropics are amoebic dysentery, bacillary (bacterial) dysentery, cholera, food infection, food intoxication, worms (helminthic infections), paratyphoid fever, protozoal dysenteries, typhoid fever, and undulant fever (Malta fever). These diseases are usually

transmitted by eating contaminated food or drinking untreated water. Contamination of food is common. The contamination may be caused in vegetable products by contact with infected material during growth, such as human excreta used as a fertilizer. Contamination of any food may be caused by dirty utensils or by food handlers who have, or are carriers of, intestinal diseases. Native fruits and vegetables which cannot be peeled or cooked should not be eaten.

b. Preventive Measures.

(1) All perishables, both meats and vegetables, which cannot be stored in a refrigerator below 44° F., should be cooked immediately upon receipt, except that frozen meats should be cooked immediately after thawing. All nonperishable food should be stored in verminfree boxes or chests. All food should be kept as free of dust as possible, and every effort must be made to prevent contamination during transit.

(2) All foods should be served immediately after preparation. No leftovers should be served. Hard bread, canned meat, and other canned foods should be issued to troops in position unless hot food can be brought up in original containers. Sandwiches and other food for lunches should not be prepared and issued for later consumption.

116. Special Tropical Diseases

Tropical bubo (lymphogranuloma inguinale), and granuloma inguinale are diseases which may be transmitted through sexual intercourse. Tropical bubo is a virus disease. The initial lesion is so small that it usually passes unnoticed. Later the lymph glands in the groin become enlarged, break down, and ulcerate. Granuloma inguinale is usually limited to the genitalia and inguinal region, but may spread to other parts of the body. The lesions consist of large ulcerating areas which spread, gradually destroying the tissue as they advance.

117. Fungus Diseases of Skin and Hair

a. Diseases. Ringworm (tinea); athlete's foot (Epidermophytosis of the feet); and trichophytosis, a fungus disease of the hair, are the principal fungus diseases. The seriousness of these diseases, especially those of the ears and feet, is seldom realized except by men with long jungle experience. These diseases are especially serious in the jungle because—

(1) The climate favors the growth of the microscopic plants called fungi which produce these diseases.

(2) Sweat soaked skin invites attack by fungus.

(3) More individual effort is required to keep the body and clothes clean.

(4) The extreme fatigue resulting from jungle marching is apt to cause soldiers

to neglect to wash their clothes and bodies even though they have been told their health depends on cleanliness.

(5) Some men lacking jungle experience falsely believe they are tough enough to stay healthy in the tropics and need not take the precautions prescribed.

b. Preventive Measures. It is much easier to prevent fungus diseases of the skin and hair than to cure them. The following preventive measures are important:

(1) Keep as clean as possible, and wash as often as is practicable. Use plenty of soap and water when available, both for bathing and washing clothes. Socks should be washed with soap at least once a day. If a stream cannot be reached after making camp, use a part of the water in the canteen and a little soap to wash at least the armpits, groin, and feet.

(2) Do not go barefooted in the jungle.

(3) As far as possible, avoid soiling clothes. Avoid mud. Use the machete to provide a clean place to rest during halts. Unnecessary dirtiness is a sign of stupidity, not toughness.

(4) Keep the skin dry, well ventilated, and free from tight clothing. Wear only enough clothing to afford protection from insects and thorns. Do not wear underclothes unless the other clothing chafes

you. Wear clothing and shoes that will allow air to reach the skin.

(5) Sleep with as little clothing as the temperature permits. Never sleep in wet, dirty clothing.

(6) When the tactical situation permits, sleep off the ground, preferably in a hammock or on a platform.

(7) Clean under and around the nails of the hands and feet.

(8) Take sunbaths for short periods whenever practicable, but do not let the skin burn.

(9) Stay away from native houses. Live and camp in clean, uninhabited jungle.

(10) Dust socks and the inside of shoes with foot powder.

(11) Wash and sun articles, such as packboards, used by more than one man.

(12) Officers and NCOs must hold frequent foot inspections.

c. Individual Jungle Treatment of Fungus Skin Infections.

(1) During prolonged jungle operations, each soldier must take care of his skin and make every possible effort to keep infected skin areas clean, dry, well ventilated, and protected. Soap and water help to cure, as well as prevent fungus infections.

(2) After washing, and just before retiring, treat infected skin areas with antifungus

medicine. Do not scratch insect bites. In the case of rashes around the crotch, under the arms and between the toes, do not use the Army fungicidal ointment. Use compresses of cool, clean water, followed by application of Army foot powder. This foot powder helps both foot and body rashes of the milder types.

(3) In general, avoid bandages and greasy medicines. Dry up fungus infections with drying medicines in conjunction with air and sunlight.

(4) Clean off dead, infected skin. Do not scratch.

(5) Boil clothing, especially socks, when you have the opportunity. Do not wear one sock first on an infected foot and then on a healthy foot. Dry, stretch, and soften socks before replacing in field kit.

(6) Avoid overtreating. Follow instructions. Do not use too much medicine or apply it too often.

(7) Consider all skin diseases as serious. Treat them regularly, intelligently, and patiently.

d. Remedial Action. Fungus diseases, if neglected, will incapacitate many men, regardless of personal cleanliness and the use of foot powder. At the first symptoms of a fungus infection, use the prescribed medicine carried in the individual or group first aid kits. When inflammation or itch-

ing is excessive consult a medical officer as soon as possible.

Section III. EVACUATION

118. General

The evacuation of wounded in jungle warfare presents a difficult problem. The task of carrying a casualty to the medical installation may require the traversing of rough terrain. There is a higher proportion of litter wounded cases than ordinarily encountered since even a slightly wounded individual may find it impossible to struggle over rough terrain. As a result, the casualty ordinarily classified as "walking wounded" may become a litter case.

a. Equipment. The usual equipment and property prescribed by the table of organization and equipment for units concerned with evacuation are not always suitable for operation under jungle conditions. Cross-country ambulances are seldom practicable on jungle trails, in swamps, and on unimproved muddy roads, rutted by heavy traffic. For this reason, other types of vehicles, particularly weapons carriers and ¼-ton trucks, may be used for transporting the wounded. All types of transportation, whether by water, land, or air may be used to transport casualties to the rear. The principle applies not only to vehicles assigned primarily for this purpose, but also to empty supply vehicles returning from forward positions. Evacuation in the jungle would normally be along

supply routes which are adequately protected against enemy action. Boats, rafts, and ambulance barges may be used for short distances when practicable to evacuate by water. When open terrain or water permits landing and takeoff, fixed-wing aircraft and helicopters provide an excellent and rapid means of evacuation.

b. Litters. The standard folding litter has some disadvantages when evacuation involves the crossing of streams, gullies, and steep slopes. Metal basket litters (mountain type) are more practicable under these conditions and can also be used to advantage when casualties are being moved from jungle areas to ships for evacuation by water. The metal basket litter can be used with the cacolet type pack saddle to evacuate casualties by pack animal. Native litter bearers may prefer to use ordinary canvas sheets with loops for poles. The canvas sheeting is light, and poles may be cut when needed. All available means for collecting and transporting the sick and wounded must be used to do the job satisfactorily. Ordinarily no one method will suffice. For general methods of transporting the sick and wounded, see FM 8–35.

c. Human Factors.

(1) It is easy to overestimate the strength and endurance of litter squads. Well-conditioned men, carrying a patient on a litter for 400 to 600 yards over jungle terrain, are unable to repeat the performance without an appreciable amount of rest. Surgeons must keep their com-

manders informed of the adequacy and efficiency of the evacuation system, and commanders must provide additional natives when practicable and, at times, men from other units of the command.

(2) No man should be evacuated who may be treated locally and returned to duty.

APPENDIX I

REFERENCES

AR	320–5	Dictionary of United States Army Terms.
AR	320–50	Authorized Abbreviations
AR	385–63	Regulations for firing ammunition for training, target practice and combat.
FM	1–5	Army Aviation; Organization and Employment.
	1–100	Army Aviation
	3–5	Tactics and Techniques of chemical, biological and radiological (CBR) warfare.
	5–20	Camouflage, basic principles and field camouflage.
	5–31	Use and Installation of Booby-traps.
	6–20	Field Artillery tactics and techniques.
	6–21	Division Artillery
	6–50	4.2-inch mortar M30
	7–10	Rifle company, Infantry and Airborne division battle groups
	7–24	Communication in Infantry and Airborne Divisions.
	7–40	Infantry and Airborne division battle groups

8–35	Transportation of the sick and wounded.
17–33	Tank units, platoon, company and battalion.
20–32	Landmine warfare
21–10	Military sanitation
21–11	First aid for soldiers
21–18	Foot marches
21–26	Map reading
21–40	Small unit procedures in Atomic, Biological and Chemical Warfare.
21–41	Soldiers handbook for nuclear, biological and chemical warfare.
21–75	Combat training of the individual soldier and patrolling.
21–76	Survival
21–77	Escape and Evasion
31–60	River-Crossing Operations
31–72	Mountain Operations
44–1	Air Defense Artillery Employment
57–35	Army Transport Aviation, Combat Operations.
100–5	Field service regulations; operations.
DA Pam 310–3	Military Publications, Index of Training Publications.

APPENDIX II
PROGRAM OF INSTRUCTION

1. Purpose and Scope

a. This program of instruction is designed to prepare units for operation in any jungle area of the world. The training is specialized in nature and progresses from individual to company level.

b. To receive maximum benefit from the training, all individuals and units must have completed all training outlined in the appropriate ATP.

c. The principles and tactical doctrines outlined in the Department of the Army publications are applicable to jungle operations. However, the difficulties caused by the terrain, vegetation, and climate necessitate special training. Training must be designed to aid the individual to overcome his fear of the jungle and to train individuals and units to take advantage of the conditions present in the jungle and exploit it to the utmost making the jungle an ally rather than an enemy.

2. Emphasis

a. During all training, special emphasis must be placed on the following factors.

Detailed planning
Small unit leadership
Physical fitness and hygiene
Navigation

Perimeter defense
Fire discipline and control
Reconnaissance
Security
Silence
Control
Communications
Supply and evacuation

b. An appreciation and knowledge of the above factors and their application in jungle warfare must be attained by all individuals in order for them to adequately train a unit for jungle warfare or to be capable to operate effectively in jungle operations.

3. Subjects To Be Presented

The following subjects should be presented. The training must be rugged, realistic and to some degree hazardous. Training is predicated on the premise that all individuals are well trained for normal operations but have no particular experience in jungle operations.

Terrain appreciation
Physiological effects of heat
Plants and food
Snakes and animals
Jungle living
Camouflage
Night training
Obstacle crossing
Day navigation
Night navigation
Trails and bridges

Supply and evacuation
Boat drill
Attack and defense
Quick fire
Transition fire
Reconnaissance patrol
Combat patrol
Ambush
Communications
Adjustment of arty fire
Reaction test
Squad fire
Evasion and escape
Raid tactics
Guerrilla opns

SUBJECT: Terrain Appreciation
HOURS: 1 (Conference)
PERSONNEL: All

SCOPE

Discussion on the characteristics and causes of the jungle landforms, vegetation and climatic conditions; the locations of the jungle areas of the world and how the jungle effects military operations.

SUBJECT: Physiological Effects of Heat on Man
HOURS: 1 (Conference)
PERSONNEL: All

SCOPE

Discussion on the effect that the tropical climate has on man upon arrival in a tropical area

and how he can preclude the heat from effecting the accomplishment of his mission. The different heat ills, their causes, symptoms and first-aid treatment are discussed.

SUBJECT: Plants and Food
HOURS: 1½ (Conference, Demonstration and Display)
PERSONNEL: All

SCOPE

Various types of plants are discussed with emphasis on how to determine whether they are edible or nonedible and, if edible, steps that must be taken to prepare them for consumption. Preparation of wild game is discussed and demonstrated. Samples of jungle plants and game are prepared and served to the students.

SUBJECT: Snakes and Animals
HOURS: 1½ (Conference, Demonstration and Display)
PERSONNEL: All

SCOPE

Snakes and animals common to the jungle are discussed, utilizing live specimens and chart. Emphasis is placed on the fear that animals and snakes have of man, and how to distinguish the poisonous snakes from the nonpoisonous. First aid treatment for snakebites is discussed. Individuals are afforded opportunity to handle certain animals and nonpoisonous snakes.

SUBJECT: Jungle Living
HOURS: 2 (Conference, Demonstration and Display)
PERSONNEL: All

SCOPE

Practical hints which will enable individuals and units to live, and operate in the jungle comfortably and effectively are discussed and demonstrated. The proper use and care of the machete is discussed and demonstrated. Personal hygiene and sanitation is emphasized. Under unit control, individuals are allotted 1 day to construct 2-man shelters. They must spend at least 3 nights in the jungle area sleeping in their shelters at night and attending training during the day. On the day that they construct their shelter, each pair of individuals is given a small game such as a rabbit or chicken, a bag of rice and a potato substitute which they must prepare as their evening meal.

SUBJECT: Camouflage
HOURS: ½ (Conference and Demonstration)
PERSONNEL: All

PURPOSE

To review the principles of camouflage and to emphasize the importance of camouflage in jungle warfare.

SCOPE

This period of instruction is a brief review of the general principles of camouflage and a discussion and demonstration of the camouflage of in-

dividuals, equipment and positions using natural and artificial materials.

SUBJECT: Night Training
HOURS: 2 (Conference, Demonstration and Practical Work)
PERSONNEL: All

SCOPE

The value of night fighting techniques while conducting military operations at night in jungle is emphasized. The conference and demonstration portion of this class stress the value of silence at night. Various noises are made and the students are required to identify the sounds to emphasize the fact that information of the enemy can be gained by the noises he may make. Night movement, night vision, cutting barbed wire, and light discipline also are stressed.

Squad size units are required to traverse a 200-yard trail and are critiqued on their actions at the conclusion of the movement.

SUBJECT: Day Navigation
HOURS: 8 (Conference and Practical Work)
PERSONNEL: All

SCOPE

A brief review is conducted on the use of the compass and basic map reading techniques. Navigational techniques in jungle terrain are then presented and discussed. Finally, the students are divided into three-man teams and required to negotiate a jungle navigation course.

SUBJECT: Obstacle Crossing
HOURS: 8 (Conference, Demonstration and Practical Work)

SCOPE

Expedient devices for crossing obstacles common to the jungle areas of the world are discussed and demonstrated. The student is taught and shown how to scale a cliff and the use of the body rappel. The use of the single and double strand rope bridges is explained and demonstrated. A rope traverse across a river demonstrates to the students a device for men and equipment to cross a large river. Finally the students are shown the techniques of constructing a brush raft which can be used in crossing a river.

After the explanation and demonstration phase of the class the students practice knot tying techniques.

The students are then divided into three (3) groups and are rotated in county-fair fashion, to practice the rope traverse, rope bridges, and rapelling techniques that were demonstrated during the classroom phase of instruction.

After every student has completed practicing the above techniques they are required to construct a brush raft and to cross the Chagres River using this means.

SUBJECT: Night Navigation
HOURS: 6 (Conference and Practical Work)
PERSONNEL: All

SCOPE

A brief review is presented on the use of the compass at night and the students are taught night navigation as it is applied to jungle terrain. The students are organized into 3-man teams and are required to negotiate a compass course during the hours of darkness.

SUBJECT: Trails and Bridges
HOURS: 2 (Conference and Demonstration)
PERSONNEL: All

SCOPE

Emphasis is placed on a thorough route reconnaissance and the use of existing trails in the jungle. The use of expedient materials for road surfaces and for construction of vehicular bridges is discussed and demonstrated.

SUBJECT: Supply and Evacuation
HOURS: 2 (Conference and Demonstration)
PERSONNEL: All

SCOPE

The means of supply, resupply, and evacuation in jungle operations is discussed with emphasis being placed on the advantages and disadvantages of each type operation. Demonstration of a resupply mission by a fixed wing aircraft, utilizing the free fall and expedient type parachute is

shown to the students. An explanation on preparing free fall bundles and expedient type parachutes utilizing shelter-halves and ponchos is also given the students.

This instruction is designed to acquaint the student with the various methods of supply, resupply and evacuation in the jungle and their advantages and disadvantages. Delivery of supplies from fixed wing aircraft employing free fall, conventional parachute, and expedient type parachute is explained and demonstrated. Finally, in a country-fair tour, various means of transporting supplies to include pack animals, native dugouts, and small military water craft is explained and demonstrated, together with methods of preparing supplies for aerial delivery.

SUBJECT: Boat Drill
HOURS: 2 (Conference-Practical Exercise)
PERSONNEL: All

SCOPE

The techniques involved in conducting a small scale river crossing utilizing dugouts (native boat) are discussed. The proper method of loading and rowing the native boats are discussed and the students are afforded an opportunity to paddle the boats in a lake, river, or lagoon. This class is to prepare the unit for a night river crossing using native boat without the aid of other services or personnel.

SUBJECT: Attack and Defense
HOURS: 2 hours (Conference) 60 hours (Practical Application)
PERSONNEL: Company

SCOPE

A tactical field exercise requiring the unit to engage in a movement to contact, defense, night withdrawal, and daylight attack in jungle terrain. During the problem, leaders will be required to apply troop leading procedures and negotiate approximately 3,000 yards of jungle terrain to accomplish all phases of the problem. Unit will be required to conduct patrols during the period occupying defensive positions.

SUBJECT: Jungle Firing (Adjustment of Artillery Fire—Quick Fire, Squad Fire and Transition Firing)
HOURS: 26 (Conference, Demonstration and Practical Exercise)

SCOPE

These are live firing exercises designed to demonstrate the duties of individuals and squads as members of a team in engaging the enemy with accurate, sustained fire, and methods of adjusting indirect fire weapons in jungle terrain.

The problem is presented in four phases. The first phase is a demonstration of fire adjustment procedures using sound sensing where rounds cannot be observed. The practical work, groups of students will adjust fire, using demonstrated methods. (2 hrs)

The second phase is a quick firing phase. Each individual proceeds down a marked trail and fires at "pop-up" targets as they appear along the side of the trail. (8 hrs)

The third phase is a squad-firing course. The squad is given the mission of flank security for its company. The problem includes establishing a hasty ambush along the trail where firing occurs. The squad will then engage linear type targets at ranges from 15 to 25 yards. (8 hours)

The fourth phase is a jungle transition firing course where the individual fires all direct fire weapons of the infantry battle group, except those found on tanks. Firing is from prepared and hasty positions. Targets appear at ranges from 25 to 200 yards. (8 hours)

SUBJECT: Reaction Test
HOURS: 8 (Practical Work)

SCOPE

In negotiating this course the student moves along a jungle trail on a mission as a messenger. As he proceeds along the trail he meets situations which he might expect to find on an actual mission of this type and is required to react to these situations. At the end of the trail he is debriefed by the unit intelligence officer concerning his activities and what he has observed during the time he has been on the trail.

SUBJECT: Reconnaissance Patrolling
HOURS: 8 (Conference and Practical Work)
PERSONNEL: Rifle Squad

SCOPE

A 2 hour review of the principles of reconnaissance patrolling is conducted with emphasis on the various techniques that are applicable to patrolling in the jungle. Each student prepares a detailed patrol order and is prepared to present it in front of the class. This is followed by a 6 hour practical exercise in reconnaissance patrolling in jungle terrain. Upon completion of the patrol the student is debriefed and critiqued on the action of his patrol.

SUBJECT: Combat Patrolling
HOURS: 8 (Conference and Practical Work)
PERSONNEL: Rifle Squads

SCOPE

This period of instruction consists of a 1 hour review of some of the tactics and techniques involved in combat patrolling, followed by a 7 hour practical exercise in combat patrolling. The students are required to prepare a combat patrol order and a student is designated by the instructor to present his solution to the class. All patrols are required to cross several thousand yards of jungle terrain, destroy an objective and return to friendly lines. Upon returning the students are debriefed and critiqued on their actions while on patrol.

SUBJECT: Ambush Patrolling
HOURS: 8 (Conference, Demonstration and Practical Work)
PERSONNEL: Rifle Squads

SCOPE

Ambush and counterambush techniques are discussed during a conference and demonstration period. Emphasis is placed on the selection of ambush sites, the employment of weapons, signals, commands and routes of withdrawal. The use of jungle materials in the construction of panji pits, deadfalls, and other expedient devices to kill or delay the enemy is covered. During the practical work period, squads and platoon size units establish ambush positions and practice counterambush techniques. Aggressor troops are used during this period.

SUBJECT: Communications
HOURS: 2 (Conference and Demonstration)
PERSONNEL: All

SCOPE

Methods are discussed on the various possibilities of restoring all types of communication to their rated capability, by use of air laid wire, and the use of expedient antennas. The various limitaitons imposed upon all types of communications by the jungle, and the many ways of minimizing these limitations are discussed.

A review is conducted of all means of communication that are available within the infantry battle group, with their limitations as applied to jungle warfare.

SUBJECT: Evasion and Escape
HOURS: 1 hr (Conference and 27 hr Application)
PERSONNEL: All

SCOPE

Stress is placed on the individual's responsibility to evade and escape hand how the jungle can assist the individual.

The practical work portion of this class should commence at the termination of a field exercise. A situation is presented to the unit which forces the unit commander to reorganize his personnel into 5-man groups and instruct these groups to evade the aggressors and return to friendly positions approximately 8,000 yards (map distance) away. This exercise compels the student to spend one night in the jungle with a minimum amount of equipment and forces him to apply all the knowledge he has gained from previous classes.

SUBJECT: Raid Tactics
HOURS: 2 (Conference and Practical Work)
PERSONNEL: Rifle Platoon

SCOPE

This period covers raid tactics in jungle terrain with emphasis placed on planning, overcoming obstacles, and utilizing the limitations imposed by the jungle terrain to achieve success. During this period the students are organized into a raiding force. The force receives an order, and planning is begun for the conduct of an actual raid which takes place at a later date.

SUBJECT: Raid Problem
HOURS: 60 (Practical Work)
PERSONNEL: Rifle Platoon

SCOPE

A field exercise requiring a unit to conduct an extended independent mission. The order is issued during the raid tactics class to afford the leaders time to formulate a plan and to conduct a reconnaissance. The raid force is required to conduct a night river crossing in native dugouts and then to negotiate approximately 18,000 yards of jungle terrain to accomplish its mission.

SUBJECT: Guerrilla Operations and Suppression
HOURS: 2 (Conference)
PERSONNEL: All

SCOPE

Discussion on the organization of a guerrilla force and the conditions desired for their organization. Historical examples of the organization and exploits of guerilla forces are mentioned and discussed. The second hour is devoted on how to suppress a guerrilla force from organizing and, if organized, how to defeat them in combat.

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For explanation of abbreviations used, see AR 320–50.

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